Another method to solve the grasshopper problem (the International Mathematical Olympiad)

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Abstract

The 6th problem of the 50th International Mathematical Olympiad (IMO), held in Germany, 2009, is called 'the grasshopper problem'. To this problem Kos[1] developed theory from unique viewpoints by reference of Noga Alon's combinatorial Nullstellensatz.

We have tried to solve this problem by an original method inspired by a polynomial function that Kos defined in [1] , then examined for n=3, 4 and 5. For almost cases the claim of this problem follows, but there remains imperfection due to 'singularity'.

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0.Introduction

The 6th problem of the 50th International Mathematical Olympiad (IMO), held in Germany, 2009, was the following.

Let $a_1, a_2, \ldots, a_n$ be distinct positive integers and let M be a set of n$-$1 positive integers not containing s=a_1+a_2+$\cdots$+a_n. A grasshopper is to jump along the real axis, starting at the point 0 and making n jumps to the right with lengths $a_1, a_2, \ldots, a_n$ in some order. Prove that the order can be chosen in such a way that the grasshopper never lands on any point in M.

According to [1], Kos says that up to now, all known solutions to this problem, so called 'the grasshopper problem', are elementary and inductive, for example, by drawing a real axis on paper. In fact a solution of ours below is one of its examples.

Then in [1], Kos tried to apply Noga Alon's combinatorial Nullstellensatz [2], which is effective but not perfect to solve the grasshopper problem, as a result he could not solve the problem with his intentional method.

So we try to present a way to solve the problem and prove it by reference of [1], even if partially.

1. Alon's combinatorial Nullstellensatz

Now we introduce an interesting tool which may help our investigation.

Lemma 1 (Nonvanishing combinatorial Nullstellensatz).

Let $S_1,\ldots,S_n$ be nonempty subsets of a field F, and let $t_1,\ldots,t_n$ be nonnegative integers such that $t_i<|S_i|$ for i=1,2,...,n. Let $\mathrm{P}(x_1,\ldots,x_n)$ be a polynomial over F with total degree $t_1+\cdots+t_n$, and suppose that the coefficient of ${x_1}^{t_1}{x_2}^{t_2}\cdots{x_n}^{t_n}$ in $\mathrm{P}(x_1,\ldots,x_n)$ is nonzero. Then there exist elements $s_1\in S_1,\ldots,s_n\in S_n$ for which $\mathrm{P}(s_1,\ldots,s_n)\neq 0$.

Also we present a polynomial function $f(x_1,x_2,\ldots,x_n)$ by reference of [1] as follows.

$$\begin{aligned} f(x_1,x_2,\ldots,x_n) &:= (x_1-m_1)(x_1-m_2)\ldots(x_1-m_{n-1})(x_1+x_2-m_1)\ldots \\ &(x_1+x_2-m_2)\cdots(x_1+x_2-m_{n-1})(x_1+\cdots+x_{n-1}-m_1)\cdots \\ &(x_1+\cdots+x_{n-1}-m_2)\cdots(x_1+\cdots+x_{n-1}-m_{n-1}) \\ &= \prod_{l=1}^{n-1}\prod_{i=1}^{n-1}((x_1+x_2+\cdots+x_l)-m_i) \end{aligned} \quad (1)$$

On the grasshopper problem now if we fix the jumping order as $a_1,a_2,\ldots,a_n$, then a grasshopper succeeds in its jumping without blocked if and only if $\mathrm{f}(a_1,...,a_n)\neq 0$, then the degree of $\mathrm{f}(a_1,...,a_n)$ is $(\mathrm{n}-1)^2$. And $x_1^{\mathrm{n}-1}x_2^{\mathrm{n}-1}\cdots x_{n-1}^{\mathrm{n}-1}$ is a monomial the total degree of which is $(\mathrm{n}-1)^2$, and the coefficient of which is 1.

Now we define n sets $S_1,S_2,\ldots,S_n$ such that $S_1=S_2=\cdots=S_n=\{a_1,a_2,\ldots,a_n\}$, then the number of elements of these n sets are $|S_1|=|S_2|=\cdots=|S_n|=\mathrm{n}>\mathrm{n}-1$, so we can adopt Lemma 1 to this polynomial function (1).

But there remains imperfection because the elements $a_1,a_2,...,a_n$ considered in Lemma 1 are not necessarily distinct, that is to say, a pair of $(a_1,\ldots,a_n)$ may be the same number.

If we multiple $\mathrm{f}(x_1,\ldots,x_n)$ by the so-called Vandermonde polynomial (see, for example, [3, pp. 346–347]), a new polynomial is created as follows.

$$\prod_{1\leq k<j\leq \mathrm{n}-1}(x_k-x_j)\prod_{l=1}^{\mathrm{n}-1}\prod_{i=1}^{\mathrm{n}-1}((x_1+x_2+\cdots+x_l)-m_i) \quad (2)$$

The elements a_1,a_2,...,a_n are required to be distinct if the new polynomial is nonzero when x_i=a_i for any i such that 1≤i≤n. But any monomial of (2) the total degree of which is equal to the degree of (2), $(\mathrm{n}-1)^2+{}_{\mathrm{n}-1}\mathrm{C}_2$, has a factor the exponent of which is over n−1. Thus Lemma 1 can not be applied.

2. Attempts to use new polynomials by permutations

We could not apply Lemma 1 to f(x_1,x_2,...,x_n) if a_1,a_2,...,a_n are distinct.

We want to find out an effective polynomial function, on the condition that the total degree is kept, if possible.

Let Sym(n) be a symmetric group of degree n. By a permutation $\pi\in$Sym(n), we get

$$\begin{aligned} &f(x_{\pi(1)}, x_{\pi(2)}, \ldots, x_{\pi(n)}) \\ &= \prod_{l=1}^{\mathrm{n}-1} \prod_{i=1}^{\mathrm{n}-1} ((x_{\pi(1)}+x_{\pi(2)}+\cdots+x_{\pi(l)})-m_i) \end{aligned} \tag{3}$$

There are totally $(\mathrm{n}-1)^2$ factors in (3).

And the total number of cases by possible permutations is n!.

Then we multiple each (3) by the signature of each permutation, that is +1 or −1, and make their summation as follows.

$$\begin{aligned} &\sum_{\pi\in\mathrm{Sym}(n)} \mathrm{sgn}(\pi) f(x_{\pi(1)}, x_{\pi(2)}, \ldots, x_{\pi(n)}) \\ &= \sum_{\pi\in\mathrm{Sym}(n)} \mathrm{sgn}(\pi) \prod_{l=1}^{n-1} \prod_{i=1}^{n-1} ((x_{\pi(1)}+x_{\pi(2)}+\cdots+x_{\pi(l)})-m_i) \end{aligned} \tag{4}$$

In (4) x_i and x_j is anti-symmetric if i is not equal to j, so it may be a multiple of the above-mentioned Vandermonde polynomial.

3. Real example for this case

3-1. the case n=3

Unfortunately Alon's combinatorial Nullstellensatz can't be applied now, because by simple computations we can see that nothing but unsuitable 4-degree monomials like $x_1^3x_2$, $x_1^3x_3$ exist. In this case $|S_1|$ must be larger than 3, applying Lemma 1 is impossible.

We compute (4) for n=3 by summing up 3!=6 polynomials as follows.

$$
\begin{aligned}
&\sum_{\pi\in\mathrm{Sym}(3)} \mathrm{sgn}(\pi) f(x_{\pi(1)}, x_{\pi(2)}) \\
&\quad = \sum_{\pi\in\mathrm{Sym}(3)} \mathrm{sgn}(\pi) \prod_{l=1}^{2}\prod_{i=1}^{2}((x_{\pi(1)}+x_{\pi(2)})-m_i) \qquad (5)
\end{aligned}
$$

The computation of (5) is the following.

$$
\begin{aligned}
(5) = {} & f(x_1,x_2,x_3)-f(x_1,x_3,x_2)-f(x_2,x_1,x_3) \\
& +f(x_2,x_3,x_1)+f(x_3,x_1,x_2)-f(x_3,x_2,x_1) \\
& =(x_1-m_1)(x_1-m_2)(x_1+x_2-m_1)(x_1+x_2-m_2) \\
& -(x_1-m_1)(x_1-m_2)(x_1+x_3-m_1)(x_1+x_3-m_2) \\
& -(x_2-m_1)(x_2-m_2)(x_2+x_1-m_1)(x_2+x_1-m_2) \\
& +(x_2-m_1)(x_2-m_2)(x_2+x_3-m_1)(x_2+x_3-m_2) \\
& +(x_3-m_1)(x_3-m_2)(x_3+x_1-m_1)(x_3+x_1-m_2) \\
& -(x_3-m_1)(x_3-m_2)(x_3+x_2-m_1)(x_3+x_2-m_2) \\
& =(x_1-x_2)(x_1-x_3)(x_2-x_3)((x_1+x_2+x_3)-(m_1+m_2)) \qquad (6)
\end{aligned}
$$

We present other computations. 3 pairs of the above 6 polynomials appear by turns.

$$
\begin{aligned}
& f(x_1,x_2,x_3)-f(x_1,x_3,x_2) \\
& \quad =(x_1-m_1)(x_1-m_2)(x_1+x_2-m_1)(x_1+x_2-m_2) \\
& \quad -(x_1-m_1)(x_1-m_2)(x_1+x_3-m_1)(x_1+x_3-m_2) \\
& \quad =(x_1-m_1)(x_1-m_2)((2x_1+x_2+x_3)-(m_1+m_2)) \qquad (7) \\
& f(x_2,x_1,x_3)-f(x_2,x_3,x_1) \\
& \quad =(x_2-m_1)(x_2-m_2)(x_2+x_1-m_1)(x_2+x_1-m_2) \\
& \quad -(x_2-m_1)(x_2-m_2)(x_2+x_3-m_1)(x_2+x_3-m_2) \\
& \quad =(x_2-m_1)(x_2-m_2)((x_1+2x_2+x_3)-(m_1+m_2)) \qquad (8) \\
& f(x_3,x_1,x_2)-f(x_3,x_2,x_1) \\
& \quad =(x_3-m_1)(x_3-m_2)(x_3+x_1-m_1)(x_3+x_1-m_2) \\
& \quad -(x_3-m_1)(x_3-m_2)(x_3+x_2-m_1)(x_3+x_2-m_2) \\
& \quad =(x_3-m_1)(x_3-m_2)((x_1+x_2+2x_3)-(m_1+m_2)) \qquad (9)
\end{aligned}
$$

Theorem 1.

Let a_1, a_2, a_3 be distinct positive integers, and m_1, m_2 be distinct positive integers, then there exists $\pi \in \mathrm{Sym}(3)$ that holds

$$f(a_{\pi(1)}, a_{\pi(2)}, a_{\pi(3)}) = (a_{\pi(1)}-m_1)(a_{\pi(1)}-m_2)(a_{\pi(1)}+a_{\pi(2)}-m_1)(a_{\pi(1)}+a_{\pi(2)}-m_2) \neq 0. \tag{10}$$

Proof.

If $f(a_{\pi(1)}, a_{\pi(2)})=(a_{\pi(1)}-m_1)(a_{\pi(1)}-m_2)(a_{\pi(1)}+a_{\pi(2)}-m_1)$ $\times(a_{\pi(1)}+a_{\pi(2)}-m_2)=0$ for any $\pi\in\mathrm{Sym}(3)$,
then four equations hold as below by (6),(7),(8) and(9).

$$(a_1-a_2)(a_1-a_3)(a_2-a_3)((a_1+a_2+a_3)-(m_1+m_2)) = 0. \tag{11}$$
$$(a_1-m_1)(a_1-m_2)((2a_1+a_2+a_3)-(m_1+m_2)) = 0. \tag{12}$$
$$(a_2-m_1)(a_2-m_2)((a_1+2a_2+a_3)-(m_1+m_2)) = 0. \tag{13}$$
$$(a_3-m_1)(a_3-m_2)((a_1+a_2+3a_3)-(m_1+m_2)) = 0. \tag{14}$$

From (11), $(a_1+a_2+a_3)-(m_1+m_2)=0$ follows, because a_1, a_2, a_3 are distinct. Then neither $2(a_1+a_2+a_3)-(m_1+m_2)$ nor $(a_1+2a_2+a_3)-(m_1+m_2)$ nor $(a_1+a_2+3a_3)-(m_1+m_2)$ is equal to 0, so $(a_1-m_1)(a_1-m_2)=0$ and $(a_2-m_1)(a_2-m_2)=0$ and $(a_3-m_1)(a_3-m_2)=0$ at (12), (13) and (14), which does not happen at the same time, this is because a_1, a_2 and a_3 are distinct and m_1 and m_2 are also distinct.

It follows that the assumption above does not come true.

This completes the proof.

□

If $f(a_1, a_2, a_3) \neq 0$, then at least one of the above-mentioned six polynomials consisting of (6) is not 0. Therefore the claim of the grasshopper problem follows for n=3, that is to say, a grasshopper succeeds in jumping without landing on m_1 or m_2 by choosing one order (a_{i1}, a_{i2}, a_{i3}) out of six possible jumping orders, such that $f(a_{i1}, a_{i2}, a_{i3})=(a_{i1}-m_1)(a_{i1}-m_2)(a_{i1}+a_{i2}-m_1)$ $(a_{i1}+a_{i2}-m_2)\neq 0$.

For the n=3's case of the grasshopper problem, $\{(a_1, a_2, a_3)|(a_1+a_2+a_3)$ $-(m_1+m_2) = 0\}$ is a 'singularity' set that may vanish the possibility of a grasshopper's safe jumping. But by comparing (6) with (7),(8) and (9), this possibility bas been easily denied.

3-2. the case n=4

We sum up 4!=24 polynomials which were made by permutation as follows.

$$\sum_{\pi\in\mathrm{Sym}(4)} \mathrm{sgn}(\pi) f(x_{\pi(1)}, x_{\pi(2)}, x_{\pi(3)})$$

$$= \sum_{\pi\in\mathrm{Sym}(4)} \mathrm{sgn}(\pi) \prod_{l=1}^{3}\prod_{i=1}^{3} ((x_{\pi(1)}+x_{\pi(2)}+x_{\pi(3)})-m_i) \tag{15}$$

The degree is 3^2=9 and the permutation number is 4!=24, so the computation of (15) is more complicated. We present the computing results for the case n=4, similarly as the case n=3, as below.

$$\begin{aligned}
(15) &= (x_1-x_2)(x_1-x_3)(x_1-x_4)(x_2-x_3)(x_2-x_4)(x_3-x_4)\\
&\times(3(x_1+x_2+x_3+x_4)-2(m_1+m_2+m_3))\\
&\times(6(x_1^2+x_2^2+x_3^2+x_4^2)+8(m_1m_2+m_1m_3+m_1m_4+m_2m_3+m_2m_4+m_3m_4)\\
&\quad -7(m_1+m_2+m_3)(x_1+x_2+x_3+x_4)\\
&\quad +(m_1^2+m_2^2+m_3^2+6m_1m_2+6m_2m_3+6m_3m_1))
\end{aligned} \tag{16}$$

$$\begin{aligned}
&f(x_1,x_2,x_3,x_4)-f(x_1,x_2,x_4,x_3)\\
&=(x_1-m_1)(x_1-m_2)(x_1-m_3)(x_1+x_2-m_1)(x_1+x_2-m_2)(x_1+x_2-m_3)\\
&\times(x_3-x_4)\\
&\times((3{x_1}^2+3{x_2}^2+{x_3}^2+{x_4}^2)+(6x_1x_2+3x_1x_3+3x_1x_4+3x_2x_3+3x_2x_4+x_3x_4)\\
&\quad -(m_1+m_2+m_3)(2x_1+2x_2+x_3+x_4)+m_1m_2+m_1m_3+m_2m_3)
\end{aligned} \tag{17}$$

Now generalizing (17), for $(x_{j1},x_{j2},x_{j3},x_{j4})$, any permutation of (x_1,x_2,x_3,x_4), we obtain

$$\begin{aligned}
&f(x_{j1},x_{j2},x_{j3},x_{j4})-f(x_{j1},x_{j2},x_{j4},x_{j3})\\
&=(x_{j1}-m_1)(x_{j1}-m_2)(x_{j1}-m_3)(x_{j1}+x_{j2}-m_1)(x_{j1}+x_{j2}-m_2)(x_{j1}+x_{j2}-m_3)\\
&\times(x_{j3}-x_{j4})\\
&\times((3x_{j1}^2+3x_{j2}^2+x_{j3}^2+x_{j4}^2)+(6x_{j1}x_{j2}+3x_{j1}x_{j3}+3x_{j1}x_{j4}+3x_{j2}x_{j3}+3x_{j2}x_{j4}+x_{j3}x_{j4})\\
&\quad -(m_1+m_2+m_3)(2x_{j1}+2x_{j2}+x_{j3}+x_{j4})+m_1m_2+m_1m_3+m_2m_3)
\end{aligned} \tag{18}$$

From (16), for the case n=4 of the grasshopper problem, we can obtain that

$$\begin{aligned}
&\{(a_1,a_2,a_3,a_4)|\\
&\ (3(a_1+a_2+a_3+a_4)-2(m_1+m_2+m_3))\\
&\ \times(6(a_1^2+a_2^2+a_3^2+a_4^2)\\
&\quad +8(a_1a_2+a_1a_3+a_1a_4+a_2a_3+a_2a_4+a_3a_4)\\
&\quad -7(m_1+m_2+m_3)(a_1+a_2+a_3+a_4)\\
&\quad +(m_1^2+m_2^2+m_3^2+6m_1m_2+6m_2m_3+6m_3m_1))=0\}
\end{aligned} \tag{19}$$

is a 'singularity' set that may eliminate the possibility of a grasshopper's safe jumping.

Unlike the case n=3, the comparison of (18) and (19) does not lead to the solution of the grasshopper problem yet, for n=4.

For (17), when (x_1,x_2,x_3,x_4)=(1,4,2,3) and (m_1,m_2,m_3)=(2,3,10), then
$(3{x_1}^2+3{x_2}^2+{x_3}^2+{x_4}^2)+(6x_1x_2+3x_1x_3+3x_1x_4+3x_2x_3+3x_2x_4+x_3x_4)$
$-(m_1+m_2+m_3)(2x_1+2x_2+x_3+x_4)+m_1m_2+m_1m_3+m_2m_3$
$=(3\times1^2+3\times4^2+2^2+3^2)$
$+(6\times1\times4+3\times1\times2+3\times1\times3+3\times4\times2+3\times4\times3+2\times3)$
$-(2+3+10)(2\times1+2\times4+2+3)+(2\times3+2\times10+3\times10)$
$=64+105-225+56=0$

It follows that (17) is equal to 0 for this case, which does not require
$(x_1-m_1)(x_1-m_2)(x_1-m_3)(x_1+x_2-m_1)(x_1+x_2-m_2)(x_1+x_2-m_3)=0$,
in fact, $(1-2)(1-3)(1-10)(1+4-2)(1+4-3)(1+4-10)\neq0$.

And the condition that (x_1,x_2,x_3,x_4)=(1,4,2,3) and (m_1,m_2,m_3) =(2,3,10) fulfills (16)=0. In short, when (m_1,m_2,m_3)=(2,3,10), (x_1,x_2,x_3,x_4) =(1,4,2,3) is an element of so-called the 'singularity' set.

(x_1,x_2,x_3,x_4)=(1,4,2,3) does not restrict the value of $(x_1-m_1)(x_1-m_2)(x_1-m_3)$ $\times(x_1+x_2-m_1)(x_1+x_2-m_2)(x_1+x_2-m_3)$, therefore we can not approach the proof of the case n=4 like Theorem 1.

3-3. the case n=5

We sum up 5!=120 polynomials which were made by permutation, as follows.

$$\sum_{\pi\in\mathrm{Sym}(5)} \mathrm{sgn}(\pi) f(x_{\pi(1)},x_{\pi(2)},x_{\pi(3)},x_{\pi(4)})$$
$$= \sum_{\pi\in\mathrm{Sym}(5)} \mathrm{sgn}(\pi)\prod_{l=1}^{4}\prod_{i=1}^{4}((x_{\pi(1)}+x_{\pi(2)}+x_{\pi(3)}+x_{\pi(4)})-m_i) \qquad (20)$$

The computation of (20) is very complicated, so we only show the result in the appendix, how long it is as below.

Unlike the cases n=3 and 4, the computing result does not include a factor that consists both of $(a_1+a_2+a_3+a_4+a_5)$ and $(m_1+m_2+m_3+m_4)$, for example $3(a_1+a_2+a_3+a_4+a_5)-2(m_1+m_2+m_3+m_4)$.

4. One more theorem

Now we present a new theorem.

Theorem 2.

Let $a_1, a_2, \ldots, a_n$ be distinct positive integers such that $0<a_1<a_2, \ldots <a_n$, and $m_1, m_2, \ldots, m_{n-1}$ be distinct positive integers.

Now if any two distinct subsets of $\{a_1, a_2, \ldots, a_n\}$, $\{r_1, r_2, \ldots, r_t\}$ and $\{s_1, s_2, \ldots, s_u\}$, hold

$$\sum_{\mathrm{v}=1}^{\mathrm{t}} \mathrm{r_v} \neq \sum_{\mathrm{w}=1}^{\mathrm{u}} \mathrm{s_w}, \tag{21}$$

then the claim of the grasshopper problem follows.

Proof.

There are totally n! expressions in the form of (3) for degree n. For any above-mentioned subset if the sum total of each element is equal to one element of $\{m_1, m_2, \ldots, m_{n-1}\}$, then any expression that includes the above-mentioned sum total is equal to 0.

For example if $(a_1+a_2-m_2)=0$ then

$f(a_1, a_2, \ldots, a_n)=\prod_{l=1}^{\mathrm{n}-1}\prod_{i=1}^{\mathrm{n}-1}((a_1+a_2+\cdots+a_l)-m_i)=0$

Also there are $\mathrm{n}!/{}_{\mathrm{n}}\mathrm{C}_2$ expressions, which are in the form of (3), that include $(a_1+a_2-m_2)$ in.

Whenever the fact that $(x_{\pi(1)}+x_{\pi(2)}+\cdots+x_{\pi(l)})-m_i=0$ is found, then the expressions in the form of (3), the values of which are 0, newly increased, in the condition that there is at least one expression that includes $(x_{\pi(1)}+x_{\pi(2)}+\cdots+x_{\pi(l)})-m_i$ and its value is not found to be 0 yet. The number of increase is, at most, $\mathrm{n}!/({}_{\mathrm{n}}\mathrm{C}_{\mathrm{l}})$. For any l the largest increasing number is $\mathrm{n}!/({}_{\mathrm{n}}\mathrm{C}_1)=(\mathrm{n}-1)!$, because ${}_{\mathrm{n}}\mathrm{C}_1 \leq {}_{\mathrm{n}}\mathrm{C}_{\mathrm{l}}$.

According to the assumption above, the possible largest number of the expressions whose values are 0 is $(\mathrm{n}-1)! \times (\mathrm{n}-1)$.

As a result at least $\mathrm{n}!-(\mathrm{n}-1)!(\mathrm{n}-1)=(\mathrm{n}-1)!$ expressions remain to be nonzero.

This completes Theorem 2.

□

In fact, the condition (21) above is not necessarily guaranteed [4], so we can not apply Theorem 2 easily.

For the case n=4, there are 10 pairs for which we can not determine one of the two integers are equal to the other, as follows, (a_1+a_2, a_3),$(a_1+a_2+a_4, a_3+a_4)$,

$(a_1{+}a_2, a_4)$,$(a_1{+}a_2{+}a_3, a_3{+}a_4)$,$(a_1{+}a_3, a_4)$,$(a_1{+}a_2{+}a_3, a_2{+}a_4)$,
$(a_2{+}a_3, a_4)$,$(a_1{+}a_2{+}a_3, a_1{+}a_4)$,$(a_1{+}a_4, a_2{+}a_3)$,$(a_1{+}a_2{+}a_3, a_4)$.

5. Proof of the grasshopper problem

For perfection we show a proof for the grasshopper problem of ours, we prove it elementarily and inductively.

Here we show the grasshopper problem again.

Let $a_1, a_2, \ldots, a_n$ be distinct positive integers and let M be a set of n−1 positive integers not containing s=$a_1{+}a_2{+}\cdots{+}a_n$. A grasshopper is to jump along the real axis, starting at the point 0 and making n jumps to the right with lengths $a_1, a_2, \ldots, a_n$ in some order. Prove that the order can be chosen in such a way that the grasshopper never lands on any point in M.

Proof.

Let A be a set consisting of $a_1, a_2, \ldots, a_n$. Without the loss of generality, we can denote the largest element of A by a_1.

And for M=$\{m_1, m_2, \ldots, m_{n-1}\}$ we suppose $m_1{<}m_2{<}\cdots{<}m_{n-1}$.

There are totally 5 cases for the relation of a_1 and m_1 as follows.

(a) $a_1{<}m_1$

(b) $a_1{=}m_1$

(c) $a_1{>}m_1$ and $a_1{<}m_{n-1}$ and $a_1{\neq}m_j$
 (for any integer j such that 1≤j≤n−1)

(d) $a_1{>}m_{n-1}$

(e) $a_1{=}m_j$(for an integer j such that 2≤j≤n−1)

We can prove inductively.

When n=2, A=$\{a_1, a_2\}$ and M=$\{m_1\}$. There are two jumping orders, (a_1, a_2) and (a_2, a_1). According to assumption, $a_1{\neq}m_1$ or $a_2{\neq}m_1$. As a result for at least one of the two orders the claim of this problem follows, that is to say, then a grasshopper can succeed in jumping without blocked.

When n≤k, we assume that the claim of the problem follows for A=$\{a_1, a_2, \ldots, a_n\}$ and M=$\{m_1, m_2, \ldots, m_{n-1}\}$. In this case, we may regard that any point in M exists between 0 and $a_1{+}a_2{+}\cdots{+}a_n$, then the claim of this problem still follows.

[For the case (a)]

Suppose that when n=k+1 a grasshopper selects a jumping order, $(a_1, a_2, \ldots, a_{k+1})$. Now $a_1{<}m_1$. We consider a series of k jumps $(a_2, \ldots, a_k, a_{k+1})$ starting from a_1. For this case, we may regard A=$\{a_2, \ldots, a_k, a_{k+1}\}$ and M=$\{m_1{-}a_1, \ldots, m_k{-}a_1\}$ on the basis of a_1. There are k points in M between

0 and $a_2+\cdots+a_{k+1}$. So the claim of the problem does not follow. Now we temporally omit m_1-a_1 out of M. Therefore M=$\{m_2-a_1,\ldots,m_k-a_1\}$. So the claim of the problem follows, in short, there is at least one permutation of $(a_2,\ldots,a_k,a_{k+1})$ that let a grasshopper jump safe without blocked.

If we denote this series of k jumps by $(a_{h2},\ldots,a_{hk},a_{h(k+1)})$, the total series of k+1 jumps $(a_1,a_{h2},\ldots,a_{hk},a_{h(k+1)})$ does not let a grasshopper jump safe, because in fact above-mentioned m_1, a point in M, still exists and has a possibility of being landed on by a grasshopper. If not, a grasshopper can jump safe, but if so, there exists an integer l such that 2≤l≤k and $a_1+a_{h2}+\cdots+a_{hl} = m_1$. Then by exchanging the first jump for the (l+1)-th jump, we get $(a_{h(l+1)},a_2,\ldots,a_{h(l-1)},a_1,a_{h(l+1)},\ldots,a_{h(k+1)})$ that let a grasshopper jump safe.

As a result the claim of the problem follows.

[For the case (b)]

Suppose that when n=k+1 a grasshopper selects a jumping order, $(a_1,a_2,\ldots,a_{k+1})$. Now $a_1=m_1$. We consider a series of k jumps $(a_2,\ldots,a_k,a_{k+1})$ starting from a_1. For this case, we may regard A=$\{a_2,\ldots,a_k,a_{k+1}\}$ and M=$\{m_2-a_1,\ldots,m_k-a_1\}$ on the basis of a_1. There are k−1 points in M between 0 and $a_2+\cdots+a_{k+1}$. So the claim of the problem follows, in short, there is at least one permutation of $(a_2,\ldots,a_k,a_{k+1})$ that let a grasshopper jump safe without blocked.

If we denote this series of k jumps by $(a_{h2},\ldots,a_{hk},a_{h(k+1)})$, the total series of k+1 jumps $(a_1,a_{h2},\ldots,a_{hk},a_{h(k+1)})$ does not let a grasshopper jump safe, because only a_1 is a point in M. Then by exchanging the first jump for the second jump, we get $(a_{h2},a_1,\ldots,a_{hk},a_{h(k+1)})$ that let a grasshopper jump safe.

As a result the claim of the problem follows.

[For the case (c)]

Suppose that when n=k+1 a grasshopper selects a jumping order, $(a_1,a_2,\ldots,a_{k+1})$. Now $m_j<a_1<m_{j+1}$(for an integer j such that 2≤j≤k). We consider a series of k jumps $(a_2,\ldots,a_k,a_{k+1})$ starting from a_1. For this case, we may regard A=$\{a_2,\ldots,a_k,a_{k+1}\}$ and M=$\{m_{j+1}-a_1,\ldots,m_k-a_1\}$ on the basis of a_1. There are k−j points in M between 0 and $a_2+\cdots+a_{k+1}$. So the claim of the problem sufficiently follows, in short, there is at least one permutation of $(a_2,\ldots,a_k,a_{k+1})$ that let a grasshopper jump safe without blocked.

Moreover a_1 is not any point in M.

If we denote this series of k jumps by $(a_{h2},\ldots,a_{hk},a_{h(k+1)})$, the total series of k+1 jumps $(a_1,a_{h2},\ldots,a_{hk},a_{h(k+1)})$ let a grasshopper jump safe.

As a result the claim of the problem follows.

[For the case (d)]

We easily see the claim of the problem follows.
[For the case (e)]

Suppose that when n=k+1 a grasshopper selects a jumping order, $(a_1, a_2, \ldots, a_{k+1})$. Now $a_1{=}m_j$(for an integer j such that 2≤j≤k). According to assumption, at least k−(j−1)=k−j+1 elements of a set $\{a_2, \ldots, a_{k+1}\}$ are not equal to any point in M and let a_g be one of its examples.

Now we consider (a_g, a_1), which represents the first part sequence of 2 jumps of a sequence of k+1 jumps. The landing point of the first jump is a_g, that is not any point in M. And the landing point of the second jump is $a_g{+}a_1$. Note that $m_j{=}a_1{<}a_g{+}a_1{<}a_1{+}a_2{+}\cdots{+}a_{k+1}$ and $m_k{<}a_1{+}a_2{+}\cdots{+}a_{k+1}$.

There are at most k−j examples that $a_g{+}a_1$ is any point in M. But totally there are at least k−j+1 examples for a_g. Hence a grasshopper succeeds in at least one of the first part sequences of 2 jumps without blocked. Also a grasshopper can jump safe for the second part sequence of k−1 jumps by selecting a suitable jumping order, according to assumption.

As a result the claim of the problem follows.

□

6. Discussion and conclusion

As we explained in the introduction, it is said that this grasshopper problem can be proved only by elementary and inductive methods(see [1], and we showed above).

And if they intend to solve by the current method we have shown, there is not perfection yet.

We can easily assume anti-symmetry of the polynomial function (4). But there is a big drawback, that is to say, 'singularity'. It is not easy to analyze when n is more than 3.

In short, we are still destined to solve elementarily and deductively, though in most cases, except for 'singularity', a grasshopper succeeds in jumping, judging from (4).

We plan to solve the grasshopper problem by analyzing equations for n's larger than 3 with the aid of Theorem 2.

Last but not least, in the proof of ours above, we do not rely on the condition at all that $a_1, a_2, \ldots, a_n$ and sets of M are integer.

In short, if the grasshopper problem is as the following,

Let $a_1, a_2, \ldots, a_n$ be distinct positive **numbers** and let M be a set of n−1 positive **numbers** not containing s=$a_1{+}a_2{+}\cdots{+}a_n$. A grasshopper is to jump along the real axis, starting at the point 0 and making n jumps to the right with lengths $a_1, a_2, \ldots, a_n$ in some order. Prove that the order can be chosen in such a way that the grasshopper never lands on any point in M.

then the claim of this refined problem still follows.

references

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Appendix

$$(20) =(x_1-x_2)(x_1-x_3)(x_1-x_4)(x_1-x_5)(x_2-x_3)(x_2-x_4)(x_2-x_5)(x_3-x_4)(x_3-x_5)(x_4-x_5)$$
$$\times(616x_1^6+2440x_1^5x_2+4708x_1^4x_2^2+5744x_1^3x_2^3+4708x_1^2x_2^4+2440x_1x_2^5+616x_2^6+2440x_1^5x_3$$
$$+8332x_1^4x_2x_3+13692x_1^3x_2^2x_3+13692x_1^2x_2^3x_3+8332x_1x_2^4x_3+2440x_2^5x_3+4708x_1^4x_3^2$$
$$+13692x_1^3x_2x_3^2+18436x_1^2x_2^2x_3^2+13692x_1x_2^3x_3^2+4708x_2^4x_3^2+5744x_1^3x_3^3+13692x_1^2x_2x_3^3$$
$$+13692x_1x_2^2x_3^3+5744x_2^3x_3^3+4708x_1^2x_3^4+8332x_1x_2x_3^4+4708x_2^2x_3^4+2440x_1x_3^5+2440x_2x_3^5$$
$$+616x_3^6+2440x_1^5x_4+8332x_1^4x_2x_4+13692x_1^3x_2^2x_4+13692x_1^2x_2^3x_4+8332x_1x_2^4x_4$$
$$+2440x_2^5x_4+8332x_1^4x_3x_4+24040x_1^3x_2x_3x_4+32280x_1^2x_2^2x_3x_4$$
$$+24040x_1x_2^3x_3x_4+8332x_2^4x_3x_4+13692x_1^3x_3^2x_4+32280x_1^2x_2x_3^2x_4+32280x_1x_2^2x_3^2x_4$$
$$+13692x_2^3x_3^2x_4+13692x_1^2x_3^3x_4+24040x_1x_2x_3^3x_4+13692x_2^2x_3^3x_4+8332x_1x_3^4x_4$$
$$+8332x_2x_3^4x_4+2440x_3^5x_4+4708x_1^4x_4^2+13692x_1^3x_2x_4^2+18436x_1^2x_2^2x_4^2+13692x_1x_2^3x_4^2$$
$$+4708x_2^4x_4^2+13692x_1^3x_3x_4^2+32280x_1^2x_2x_3x_4^2+32280x_1x_2^2x_3x_4^2+13692x_2^3x_3x_4^2$$
$$+18436x_1^2x_3^2x_4^2+32280x_1x_2x_3^2x_4^2+18436x_2^2x_3^2x_4^2+13692x_1x_3^3x_4^2+13692x_2x_3^3x_4^2$$
$$+4708x_3^4x_4^2+5744x_1^3x_4^3+13692x_1^2x_2x_4^3+13692x_1x_2^2x_4^3$$
$$+5744x_2^3x_4^3+13692x_1^2x_3x_4^3+24040x_1x_2x_3x_4^3+13692x_2^2x_3x_4^3$$
$$+13692x_1x_3^2x_4^3+13692x_2x_3^2x_4^3+5744x_3^3x_4^3+4708x_1^2x_4^4+8332x_1x_2x_4^4$$
$$+4708x_2^2x_4^4+8332x_1x_3x_4^4+8332x_2x_3x_4^4+4708x_3^2x_4^4+2440x_1x_4^5+2440x_2x_4^5$$
$$+2440x_3x_4^5+616x_4^6+2440x_1^5x_5+8332x_1^4x_2x_5+13692x_1^3x_2^2x_5+13692x_1^2x_2^3x_5$$
$$+8332x_1x_2^4x_5+2440x_2^5x_5+8332x_1^4x_3x_5+24040x_1^3x_2x_3x_5+32280x_1^2x_2^2x_3x_5$$
$$+24040x_1x_2^3x_3x_5+8332x_2^4x_3x_5+13692x_1^3x_3^2x_5+32280x_1^2x_2x_3^2x_5$$
$$+32280x_1x_2^2x_3^2x_5+13692x_2^3x_3^2x_5+13692x_1^2x_3^3x_5+24040x_1x_2x_3^3x_5$$
$$+13692x_2^2x_3^3x_5+8332x_1x_3^4x_5+8332x_2x_3^4x_5+2440x_3^5x_5$$
$$+8332x_1^4x_4x_5+24040x_1^3x_2x_4x_5+32280x_1^2x_2^2x_4x_5+24040x_1x_2^3x_4x_5$$
$$+8332x_2^4x_4x_5+24040x_1^3x_3x_4x_5+56328x_1^2x_2x_3x_4x_5+56328x_1x_2^2x_3x_4x_5$$
$$+24040x_2^3x_3x_4x_5+32280x_1^2x_3^2x_4x_5+56328x_1x_2x_3^2x_4x_5+32280x_2^2x_3^2x_4x_5$$
$$+24040x_1x_3^3x_4x_5+24040x_2x_3^3x_4x_5+8332x_3^4x_4x_5+13692x_1^3x_4^2x_5$$
$$+32280x_1^2x_2x_4^2x_5+32280x_1x_2^2x_4^2x_5+13692x_2^3x_4^2x_5+32280x_1^2x_3x_4^2x_5$$
$$+56328x_1x_2x_3x_4^2x_5+32280x_2^2x_3x_4^2x_5+32280x_1x_3^2x_4^2x_5+32280x_2x_3^2x_4^2x_5$$
$$+13692x_3^3x_4^2x_5+13692x_1^2x_4^3x_5+24040x_1x_2x_4^3x_5+13692x_2^2x_4^3x_5$$
$$+24040x_1x_3x_4^3x_5+24040x_2x_3x_4^3x_5+13692x_3^2x_4^3x_5+8332x_1x_4^4x_5$$
$$+8332x_2x_4^4x_5+8332x_3x_4^4x_5+2440x_4^5x_5+4708x_1^4x_5^2+13692x_1^3x_2x_5^2$$
$$+18436x_1^2x_2^2x_5^2+13692x_1x_2^3x_5^2+4708x_2^4x_5^2+13692x_1^3x_3x_5^2$$
$$+32280x_1^2x_2x_3x_5^2+32280x_1x_2^2x_3x_5^2+13692x_2^3x_3x_5^2+18436x_1^2x_3^2x_5^2$$
$$+32280x_1x_2x_3^2x_5^2+18436x_2^2x_3^2x_5^2+13692x_1x_3^3x_5^2+13692x_2x_3^3x_5^2$$
$$+4708x_3^4x_5^2+13692x_1^3x_4x_5^2+32280x_1^2x_2x_4x_5^2+32280x_1x_2^2x_4x_5^2$$
$$+13692x_2^3x_4x_5^2+32280x_1^2x_3x_4x_5^2+56328x_1x_2x_3x_4x_5^2+32280x_2^2x_3x_4x_5^2$$
$$+32280x_1x_3^2x_4x_5^2+32280x_2x_3^2x_4x_5^2+13692x_3^3x_4x_5^2+18436x_1^2x_4^2x_5^2$$
$$+32280x_1x_2x_4^2x_5^2+18436x_2^2x_4^2x_5^2+32280x_1x_3x_4^2x_5^2+32280x_2x_3x_4^2x_5^2$$
$$+18436x_3^2x_4^2x_5^2+13692x_1x_4^3x_5^2+13692x_2x_4^3x_5^2+13692x_3x_4^3x_5^2$$
$$+4708x_4^4x_5^2+5744x_1^3x_5^3+13692x_1^2x_2x_5^3+13692x_1x_2^2x_5^3+5744x_2^3x_5^3$$

$$+13692x_1^2x_3x_5^3+24040x_1x_2x_3x_5^3+13692x_2^2x_3x_5^3+13692x_1x_3^2x_5^3$$
$$+13692x_2x_3^2x_5^3+5744x_3^3x_5^3+13692x_1^2x_4x_5^3+24040x_1x_2x_4x_5^3$$
$$+13692x_2^2x_4x_5^3+24040x_1x_3x_4x_5^3+24040x_2x_3x_4x_5^3+13692x_3^2x_4x_5^3$$
$$+13692x_1x_4^2x_5^3+13692x_2x_4^2x_5^3+13692x_3x_4^2x_5^3+5744x_4^3x_5^3$$
$$+4708x_1^2x_5^4+8332x_1x_2x_5^4+4708x_2^2x_5^4+8332x_1x_3x_5^4+8332x_2x_3x_5^4$$
$$+4708x_3^2x_5^4+8332x_1x_4x_5^4+8332x_2x_4x_5^4+8332x_3x_4x_5^4+4708x_4^2x_5^4$$
$$+2440x_1x_5^5+2440x_2x_5^5+2440x_3x_5^5+2440x_4x_5^5+616x_5^6-1516x_1^5m_1$$
$$-5404x_1^4x_2m_1-9094x_1^3x_2^2m_1-9094x_1^2x_2^3m_1-5404x_1x_2^4m_1-1516x_2^5m_1$$
$$-5404x_1^4x_3m_1-16178x_1^3x_2x_3m_1-22010x_1^2x_2^2x_3m_1-16178x_1x_2^3x_3m_1-5404x_2^4x_3m_1$$
$$-9094x_1^3x_3^2m_1-22010x_1^2x_2x_3^2m_1-22010x_1x_2^2x_3^2m_1-9094x_2^3x_3^2m_1$$
$$-9094x_1^2x_3^3m_1-16178x_1x_2x_3^3m_1-9094x_2^2x_3^3m_1-5404x_1x_3^4m_1$$
$$-5404x_2x_3^4m_1-1516x_3^5m_1-5404x_1^4x_4m_1-16178x_1^3x_2x_4m_1-22010x_1^2x_2^2x_4m_1-16178x_1x_2^3x_4m_1$$
$$-5404x_2^4x_4m_1-16178x_1^3x_3x_4m_1-38946x_1^2x_2x_3x_4m_1-38946x_1x_2^2x_3x_4m_1$$
$$-16178x_2^3x_3x_4m_1-22010x_1^2x_3^2x_4m_1-38946x_1x_2x_3^2x_4m_1$$
$$-22010x_2^2x_3^2x_4m_1-16178x_1x_3^3x_4m_1-16178x_2x_3^3x_4m_1$$
$$-5404x_3^4x_4m_1-9094x_1^3x_4^2m_1$$
$$-22010x_1^2x_2x_4^2m_1-22010x_1x_2^2x_4^2m_1-9094x_2^3x_4^2m_1-22010x_1^2x_3x_4^2m_1-38946x_1x_2x_3x_4^2m_1$$
$$-22010x_2^2x_3x_4^2m_1-22010x_1x_3^2x_4^2m_1-22010x_2x_3^2x_4^2m_1$$
$$-9094x_3^3x_4^2m_1-9094x_1^2x_4^3m_1$$
$$-16178x_1x_2x_4^3m_1-9094x_2^2x_4^3m_1-16178x_1x_3x_4^3m_1-16178x_2x_3x_4^3m_1$$
$$-9094x_3^2x_4^3m_1-5404x_1x_4^4m_1$$
$$-5404x_2x_4^4m_1-5404x_3x_4^4m_1-1516x_4^5m_1-5404x_1^4x_5m_1-16178x_1^3x_2x_5m_1-22010x_1^2x_2^2x_5m_1$$
$$-16178x_1x_2^3x_5m_1-5404x_2^4x_5m_1-16178x_1^3x_3x_5m_1-38946x_1^2x_2x_3x_5m_1$$
$$-38946x_1x_2^2x_3x_5m_1-16178x_2^3x_3x_5m_1$$
$$-22010x_1^2x_3^2x_5m_1-38946x_1x_2x_3^2x_5m_1-22010x_2^2x_3^2x_5m_1$$
$$-16178x_1x_3^3x_5m_1-16178x_2x_3^3x_5m_1-5404x_3^4x_5m_1$$
$$-16178x_1^3x_4x_5m_1-38946x_1^2x_2x_4x_5m_1-38946x_1x_2^2x_4x_5m_1-16178x_2^3x_4x_5m_1-38946x_1^2x_3x_4x_5m_1$$
$$-68700x_1x_2x_3x_4x_5m_1-38946x_2^2x_3x_4x_5m_1-38946x_1x_3^2x_4x_5m_1$$
$$-38946x_2x_3^2x_4x_5m_1-16178x_3^3x_4x_5m_1-22010x_1^2x_4^2x_5m_1-38946x_1x_2x_4^2x_5m_1-22010x_2^2x_4^2x_5m_1$$
$$-38946x_1x_3x_4^2x_5m_1-38946x_2x_3x_4^2x_5m_1-22010x_3^2x_4^2x_5m_1-16178x_1x_4^3x_5m_1-16178x_2x_4^3x_5m_1$$
$$-16178x_3x_4^3x_5m_1-5404x_4^4x_5m_1-9094x_1^3x_5^2m_1-22010x_1^2x_2x_5^2m_1-22010x_1x_2^2x_5^2m_1$$
$$-9094x_2^3x_5^2m_1-22010x_1^2x_3x_5^2m_1-38946x_1x_2x_3x_5^2m_1-22010x_2^2x_3x_5^2m_1-22010x_1x_3^2x_5^2m_1$$
$$-22010x_2x_3^2x_5^2m_1-9094x_3^3x_5^2m_1-22010x_1^2x_4x_5^2m_1-38946x_1x_2x_4x_5^2m_1-22010x_2^2x_4x_5^2m_1$$
$$-38946x_1x_3x_4x_5^2m_1-38946x_2x_3x_4x_5^2m_1-22010x_3^2x_4x_5^2m_1-22010x_1x_4^2x_5^2m_1-22010x_2x_4^2x_5^2m_1$$
$$-22010x_3x_4^2x_5^2m_1-9094x_4^3x_5^2m_1-9094x_1^2x_5^3m_1-16178x_1x_2x_5^3m_1-9094x_2^2x_5^3m_1$$
$$-16178x_1x_3x_5^3m_1-16178x_2x_3x_5^3m_1-9094x_3^2x_5^3m_1-16178x_1x_4x_5^3m_1-16178x_2x_4x_5^3m_1$$
$$-16178x_3x_4x_5^3m_1-9094x_4^2x_5^3m_1-5404x_1x_5^4m_1-5404x_2x_5^4m_1-5404x_3x_5^4m_1-5404x_4x_5^4m_1$$
$$-1516x_5^5m_1+1305x_1^4m_1^2+4020x_1^3x_2m_1^2+5523x_1^2x_2^2m_1^2+4020x_1x_2^3m_1^2+1305x_2^4m_1^2$$
$$+4020x_1^3x_3m_1^2+9883x_1^2x_2x_3m_1^2+9883x_1x_2^2x_3m_1^2+4020x_2^3x_3m_1^2+5523x_1^2x_3^2m_1^2$$
$$+9883x_1x_2x_3^2m_1^2+5523x_2^2x_3^2m_1^2+4020x_1x_3^3m_1^2+4020x_2x_3^3m_1^2+1305x_3^4m_1^2$$
$$+4020x_1^3x_4m_1^2+9883x_1^2x_2x_4m_1^2+9883x_1x_2^2x_4m_1^2+4020x_2^3x_4m_1^2+9883x_1^2x_3x_4m_1^2$$

$$+17634x_1x_2x_3x_4m_1^2+9883x_2^2x_3x_4m_1^2+9883x_1x_3^2x_4m_1^2+9883x_2x_3^2x_4m_1^2+4020x_3^3x_4m_1^2$$
$$+5523x_1^2x_4^2m_1^2+9883x_1x_2x_4^2m_1^2+5523x_2^2x_4^2m_1^2+9883x_1x_3x_4^2m_1^2+9883x_2x_3x_4^2m_1^2$$
$$+5523x_3^2x_4^2m_1^2+4020x_1x_4^3m_1^2+4020x_2x_4^3m_1^2+4020x_3x_4^3m_1^2+1305x_4^4m_1^2$$
$$+4020x_1^3x_5m_1^2+9883x_1^2x_2x_5m_1^2+9883x_1x_2^2x_5m_1^2+4020x_2^3x_5m_1^2+9883x_1^2x_3x_5m_1^2$$
$$+17634x_1x_2x_3x_5m_1^2+9883x_2^2x_3x_5m_1^2+9883x_1x_3^2x_5m_1^2+9883x_2x_3^2x_5m_1^2+4020x_3^3x_5m_1^2$$
$$+9883x_1^2x_4x_5m_1^2+17634x_1x_2x_4x_5m_1^2+9883x_2^2x_4x_5m_1^2+17634x_1x_3x_4x_5m_1^2$$
$$+17634x_2x_3x_4x_5m_1^2+9883x_3^2x_4x_5m_1^2+9883x_1x_4^2x_5m_1^2+9883x_2x_4^2x_5m_1^2+9883x_3x_4^2x_5m_1^2$$
$$+4020x_4^3x_5m_1^2+5523x_1^2x_5^2m_1^2+9883x_1x_2x_5^2m_1^2+5523x_2^2x_5^2m_1^2+9883x_1x_3x_5^2m_1^2$$
$$+9883x_2x_3x_5^2m_1^2+5523x_3^2x_5^2m_1^2+9883x_1x_4x_5^2m_1^2+9883x_2x_4x_5^2m_1^2+9883x_3x_4x_5^2m_1^2$$
$$+5523x_4^2x_5^2m_1^2+4020x_1x_5^3m_1^2+4020x_2x_5^3m_1^2+4020x_3x_5^3m_1^2+4020x_4x_5^3m_1^2+1305x_5^4m_1^2$$
$$-459x_1^3m_1^3-1152x_1^2x_2m_1^3-1152x_1x_2^2m_1^3-459x_2^3m_1^3-1152x_1^2x_3m_1^3-2079x_1x_2x_3m_1^3$$
$$-1152x_2^2x_3m_1^3-1152x_1x_3^2m_1^3-1152x_2x_3^2m_1^3-459x_3^3m_1^3-1152x_1^2x_4m_1^3-2079x_1x_2x_4m_1^3$$
$$-1152x_2^2x_4m_1^3-2079x_1x_3x_4m_1^3-2079x_2x_3x_4m_1^3-1152x_3^2x_4m_1^3-1152x_1x_4^2m_1^3-1152x_2x_4^2m_1^3$$
$$-1152x_3x_4^2m_1^3-459x_4^3m_1^3-1152x_1^2x_5m_1^3-2079x_1x_2x_5m_1^3$$
$$-1152x_2^2x_5m_1^3-2079x_1x_3x_5m_1^3-2079x_2x_3x_5m_1^3-1152x_3^2x_5m_1^3$$
$$-2079x_1x_4x_5m_1^3-2079x_2x_4x_5m_1^3-2079x_3x_4x_5m_1^3-1152x_4^2x_5m_1^3$$
$$-1152x_1x_5^2m_1^3-1152x_2x_5^2m_1^3-1152x_3x_5^2m_1^3-1152x_4x_5^2m_1^3$$
$$-459x_5^3m_1^3+54x_1^2m_1^4+99x_1x_2m_1^4+54x_2^2m_1^4+99x_1x_3m_1^4$$
$$+99x_2x_3m_1^4+54x_3^2m_1^4+99x_1x_4m_1^4+99x_2x_4m_1^4$$
$$+99x_3x_4m_1^4+54x_4^2m_1^4+99x_1x_5m_1^4+99x_2x_5m_1^4+99x_3x_5m_1^4+99x_4x_5m_1^4+54x_5^2m_1^4-1516x_1^5m_2$$
$$-5404x_1^4x_2m_2-9094x_1^3x_2^2m_2-9094x_1^2x_2^3m_2-5404x_1x_2^4m_2$$
$$-1516x_2^5m_2-5404x_1^4x_3m_2-16178x_1^3x_2x_3m_2$$
$$-22010x_1^2x_2^2x_3m_2-16178x_1x_2^3x_3m_2-5404x_2^4x_3m_2-9094x_1^3x_3^2m_2$$
$$-22010x_1^2x_2x_3^2m_2-22010x_1x_2^2x_3^2m_2$$
$$-9094x_2^3x_3^2m_2-9094x_1^2x_3^3m_2-16178x_1x_2x_3^3m_2$$
$$-9094x_2^2x_3^3m_2-5404x_1x_3^4m_2-5404x_2x_3^4m_2-1516x_3^5m_2$$
$$-5404x_1^4x_4m_2-16178x_1^3x_2x_4m_2-22010x_1^2x_2^2x_4m_2$$
$$-16178x_1x_2^3x_4m_2-5404x_2^4x_4m_2-16178x_1^3x_3x_4m_2$$
$$-38946x_1^2x_2x_3x_4m_2-38946x_1x_2^2x_3x_4m_2-16178x_2^3x_3x_4m_2$$
$$-22010x_1^2x_3^2x_4m_2-38946x_1x_2x_3^2x_4m_2-22010x_2^2x_3^2x_4m_2$$
$$-16178x_1x_3^3x_4m_2-16178x_2x_3^3x_4m_2-5404x_3^4x_4m_2-9094x_1^3x_4^2m_2$$
$$-22010x_1^2x_2x_4^2m_2-22010x_1x_2^2x_4^2m_2$$
$$-9094x_2^3x_4^2m_2-22010x_1^2x_3x_4^2m_2-38946x_1x_2x_3x_4^2m_2-22010x_2^2x_3x_4^2m_2-22010x_1x_3^2x_4^2m_2$$
$$-22010x_2x_3^2x_4^2m_2-9094x_3^3x_4^2m_2-9094x_1^2x_4^3m_2-16178x_1x_2x_4^3m_2$$
$$-9094x_2^2x_4^3m_2-16178x_1x_3x_4^3m_2$$
$$-16178x_2x_3x_4^3m_2-9094x_3^2x_4^3m_2-5404x_1x_4^4m_2$$
$$-5404x_2x_4^4m_2-5404x_3x_4^4m_2-1516x_4^5m_2-5404x_1^4x_5m_2$$
$$-16178x_1^3x_2x_5m_2-22010x_1^2x_2^2x_5m_2-16178x_1x_2^3x_5m_2-5404x_2^4x_5m_2$$
$$-16178x_1^3x_3x_5m_2-38946x_1^2x_2x_3x_5m_2$$
$$-38946x_1x_2^2x_3x_5m_2-16178x_2^3x_3x_5m_2-22010x_1^2x_3^2x_5m_2-38946x_1x_2x_3^2x_5m_2-22010x_2^2x_3^2x_5m_2$$
$$-16178x_1x_3^3x_5m_2-16178x_2x_3^3x_5m_2-5404x_3^4x_5m_2-16178x_1^3x_4x_5m_2$$

$$-38946x_1^2x_2x_4x_5m_2-38946x_1x_2^2x_4x_5m_2$$
$$-16178x_2^3x_4x_5m_2-38946x_1^2x_3x_4x_5m_2-68700x_1x_2x_3x_4x_5m_2$$
$$-38946x_2^2x_3x_4x_5m_2-38946x_1x_3^2x_4x_5m_2$$
$$-38946x_2x_3^2x_4x_5m_2-16178x_3^3x_4x_5m_2-22010x_1^2x_4^2x_5m_2-38946x_1x_2x_4^2x_5m_2-22010x_2^2x_4^2x_5m_2$$
$$-38946x_1x_3x_4^2x_5m_2-38946x_2x_3x_4^2x_5m_2-22010x_3^2x_4^2x_5m_2-16178x_1x_4^3x_5m_2$$
$$-16178x_2x_4^3x_5m_2-16178x_3x_4^3x_5m_2-5404x_4^4x_5m_2-9094x_1^3x_5^2m_2-22010x_1^2x_2x_5^2m_2$$
$$-22010x_1x_2^2x_5^2m_2-9094x_2^3x_5^2m_2-22010x_1^2x_3x_5^2m_2-38946x_1x_2x_3x_5^2m_2-22010x_2^2x_3x_5^2m_2$$
$$-22010x_1x_3^2x_5^2m_2-22010x_2x_3^2x_5^2m_2-9094x_3^3x_5^2m_2-22010x_1^2x_4x_5^2m_2-38946x_1x_2x_4x_5^2m_2$$
$$-22010x_2^2x_4x_5^2m_2-38946x_1x_3x_4x_5^2m_2-38946x_2x_3x_4x_5^2m_2-22010x_3^2x_4x_5^2m_2-22010x_1x_4^2x_5^2m_2$$
$$-22010x_2x_4^2x_5^2m_2-22010x_3x_4^2x_5^2m_2-9094x_4^3x_5^2m_2-9094x_1^2x_5^3m_2-16178x_1x_2x_5^3m_2$$
$$-9094x_2^2x_5^3m_2-16178x_1x_3x_5^3m_2-16178x_2x_3x_5^3m_2-9094x_3^2x_5^3m_2-16178x_1x_4x_5^3m_2$$
$$-16178x_2x_4x_5^3m_2-16178x_3x_4x_5^3m_2-9094x_4^2x_5^3m_2-5404x_1x_5^4m_2-5404x_2x_5^4m_2$$
$$-5404x_3x_5^4m_2-5404x_4x_5^4m_2-1516x_5^5m_2+3450x_1^4m_1m_2+10664x_1^3x_2m_1m_2+14674x_1^2x_2^2m_1m_2$$
$$+10664x_1x_2^3m_1m_2+3450x_2^4m_1m_2+10664x_1^3x_3m_1m_2+26298x_1^2x_2x_3m_1m_2+26298x_1x_2^2x_3m_1m_2$$
$$+10664x_2^3x_3m_1m_2+14674x_1^2x_3^2m_1m_2+26298x_1x_2x_3^2m_1m_2+14674x_2^2x_3^2m_1m_2+10664x_1x_3^3m_1m_2$$
$$+10664x_2x_3^3m_1m_2+3450x_3^4m_1m_2+10664x_1^3x_4m_1m_2$$
$$+26298x_1^2x_2x_4m_1m_2+26298x_1x_2^2x_4m_1m_2$$
$$+10664x_2^3x_4m_1m_2+26298x_1^2x_3x_4m_1m_2+47004x_1x_2x_3x_4m_1m_2+26298x_2^2x_3x_4m_1m_2$$
$$+26298x_1x_3^2x_4m_1m_2+26298x_2x_3^2x_4m_1m_2+10664x_3^3x_4m_1m_2+14674x_1^2x_4^2m_1m_2$$
$$+26298x_1x_2x_4^2m_1m_2+14674x_2^2x_4^2m_1m_2+26298x_1x_3x_4^2m_1m_2+26298x_2x_3x_4^2m_1m_2$$
$$+14674x_3^2x_4^2m_1m_2+10664x_1x_4^3m_1m_2+10664x_2x_4^3m_1m_2+10664x_3x_4^3m_1m_2$$
$$+3450x_4^4m_1m_2+10664x_1^3x_5m_1m_2+26298x_1^2x_2x_5m_1m_2+26298x_1x_2^2x_5m_1m_2+10664x_2^3x_5m_1m_2$$
$$+26298x_1^2x_3x_5m_1m_2+47004x_1x_2x_3x_5m_1m_2+26298x_2^2x_3x_5m_1m_2+26298x_1x_3^2x_5m_1m_2$$
$$+26298x_2x_3^2x_5m_1m_2+10664x_3^3x_5m_1m_2+26298x_1^2x_4x_5m_1m_2+47004x_1x_2x_4x_5m_1m_2$$
$$+26298x_2^2x_4x_5m_1m_2+47004x_1x_3x_4x_5m_1m_2+47004x_2x_3x_4x_5m_1m_2+26298x_3^2x_4x_5m_1m_2$$
$$+26298x_1x_4^2x_5m_1m_2+26298x_2x_4^2x_5m_1m_2+26298x_3x_4^2x_5m_1m_2+10664x_4^3x_5m_1m_2$$
$$+14674x_1^2x_5^2m_1m_2+26298x_1x_2x_5^2m_1m_2+14674x_2^2x_5^2m_1m_2$$
$$+26298x_1x_3x_5^2m_1m_2+26298x_2x_3x_5^2m_1m_2+14674x_3^2x_5^2m_1m_2$$
$$+26298x_1x_4x_5^2m_1m_2+26298x_2x_4x_5^2m_1m_2+26298x_3x_4x_5^2m_1m_2+14674x_4^2x_5^2m_1m_2$$
$$+10664x_1x_5^3m_1m_2+10664x_2x_5^3m_1m_2+10664x_3x_5^3m_1m_2+10664x_4x_5^3m_1m_2$$
$$+3450x_5^4m_1m_2-2663x_1^3m_1^2m_2-6694x_1^2x_2m_1^2m_2-6694x_1x_2^2m_1^2m_2-2663x_2^3m_1^2m_2$$
$$-6694x_1^2x_3m_1^2m_2-12093x_1x_2x_3m_1^2m_2-6694x_2^2x_3m_1^2m_2-6694x_1x_3^2m_1^2m_2$$
$$-6694x_2x_3^2m_1^2m_2-2663x_3^3m_1^2m_2-6694x_1^2x_4m_1^2m_2-12093x_1x_2x_4m_1^2m_2$$
$$-6694x_2^2x_4m_1^2m_2-12093x_1x_3x_4m_1^2m_2-12093x_2x_3x_4m_1^2m_2-6694x_3^2x_4m_1^2m_2$$
$$-6694x_1x_4^2m_1^2m_2-6694x_2x_4^2m_1^2m_2-6694x_3x_4^2m_1^2m_2$$
$$-2663x_4^3m_1^2m_2-6694x_1^2x_5m_1^2m_2-12093x_1x_2x_5m_1^2m_2-6694x_2^2x_5m_1^2m_2$$
$$-12093x_1x_3x_5m_1^2m_2-12093x_2x_3x_5m_1^2m_2-6694x_3^2x_5m_1^2m_2$$
$$-12093x_1x_4x_5m_1^2m_2-12093x_2x_4x_5m_1^2m_2-12093x_3x_4x_5m_1^2m_2-6694x_4^2x_5m_1^2m_2$$
$$-6694x_1x_5^2m_1^2m_2-6694x_2x_5^2m_1^2m_2-6694x_3x_5^2m_1^2m_2$$
$$-6694x_4x_5^2m_1^2m_2-2663x_5^3m_1^2m_2+798x_1^2m_1^3m_2+1458x_1x_2m_1^3m_2+798x_2^2m_1^3m_2$$
$$+1458x_1x_3m_1^3m_2+1458x_2x_3m_1^3m_2+798x_3^2m_1^3m_2+1458x_1x_4m_1^3m_2$$

$+1458x_2x_4m_1^3m_2+1458x_3x_4m_1^3m_2+798x_4^2m_1^3m_2+1458x_1x_5m_1^3m_2$
$+1458x_2x_5m_1^3m_2+1458x_3x_5m_1^3m_2+1458x_4x_5m_1^3m_2+798x_5^2m_1^3m_2$
$-72x_1m_1^4m_2-72x_2m_1^4m_2-72x_3m_1^4m_2-72x_4m_1^4m_2-72x_5m_1^4m_2$
$+1305x_1^4m_2^2+4020x_1^3x_2m_2^2+5523x_1^2x_2^2m_2^2+4020x_1x_2^3m_2^2+1305x_2^4m_2^2$
$+4020x_1^3x_3m_2^2+9883x_1^2x_2x_3m_2^2+9883x_1x_2^2x_3m_2^2+4020x_2^3x_3m_2^2+5523x_1^2x_3^2m_2^2$
$+9883x_1x_2x_3^2m_2^2+5523x_2^2x_3^2m_2^2+4020x_1x_3^3m_2^2+4020x_2x_3^3m_2^2+1305x_3^4m_2^2$
$+4020x_1^3x_4m_2^2+9883x_1^2x_2x_4m_2^2+9883x_1x_2^2x_4m_2^2$
$+4020x_2^3x_4m_2^2+9883x_1^2x_3x_4m_2^2+17634x_1x_2x_3x_4m_2^2+9883x_2^2x_3x_4m_2^2$
$+9883x_1x_3^2x_4m_2^2+9883x_2x_3^2x_4m_2^2+4020x_3^3x_4m_2^2+5523x_1^2x_4^2m_2^2+9883x_1x_2x_4^2m_2^2$
$+5523x_2^2x_4^2m_2^2+9883x_1x_3x_4^2m_2^2+9883x_2x_3x_4^2m_2^2+5523x_3^2x_4^2m_2^2+4020x_1x_4^3m_2^2$
$+4020x_2x_4^3m_2^2+4020x_3x_4^3m_2^2+1305x_4^4m_2^2+4020x_1^3x_5m_2^2+9883x_1^2x_2x_5m_2^2$
$+9883x_1x_2^2x_5m_2^2+4020x_2^3x_5m_2^2+9883x_1^2x_3x_5m_2^2+17634x_1x_2x_3x_5m_2^2$
$+9883x_2^2x_3x_5m_2^2+9883x_1x_3^2x_5m_2^2+9883x_2x_3^2x_5m_2^2+4020x_3^3x_5m_2^2$
$+9883x_1^2x_4x_5m_2^2+17634x_1x_2x_4x_5m_2^2+9883x_2^2x_4x_5m_2^2+17634x_1x_3x_4x_5m_2^2$
$+17634x_2x_3x_4x_5m_2^2+9883x_3^2x_4x_5m_2^2+9883x_1x_4^2x_5m_2^2+9883x_2x_4^2x_5m_2^2$
$+9883x_3x_4^2x_5m_2^2+4020x_4^3x_5m_2^2+5523x_1^2x_5^2m_2^2+9883x_1x_2x_5^2m_2^2+5523x_2^2x_5^2m_2^2$
$+9883x_1x_3x_5^2m_2^2+9883x_2x_3x_5^2m_2^2+5523x_3^2x_5^2m_2^2+9883x_1x_4x_5^2m_2^2$
$+9883x_2x_4x_5^2m_2^2+9883x_3x_4x_5^2m_2^2+5523x_4^2x_5^2m_2^2+4020x_1x_5^3m_2^2$
$+4020x_2x_5^3m_2^2+4020x_3x_5^3m_2^2+4020x_4x_5^3m_2^2+1305x_5^4m_2^2-2663x_1^3m_1m_2^2$
$-6694x_1^2x_2m_1m_2^2-6694x_1x_2^2m_1m_2^2-2663x_2^3m_1m_2^2-6694x_1^2x_3m_1m_2^2$
$-12093x_1x_2x_3m_1m_2^2-6694x_2^2x_3m_1m_2^2-6694x_1x_3^2m_1m_2^2-6694x_2x_3^2m_1m_2^2$
$-2663x_3^3m_1m_2^2-6694x_1^2x_4m_1m_2^2-12093x_1x_2x_4m_1m_2^2-6694x_2^2x_4m_1m_2^2$
$-12093x_1x_3x_4m_1m_2^2-12093x_2x_3x_4m_1m_2^2-6694x_3^2x_4m_1m_2^2-6694x_1x_4^2m_1m_2^2$
$-6694x_2x_4^2m_1m_2^2-6694x_3x_4^2m_1m_2^2-2663x_4^3m_1m_2^2-6694x_1^2x_5m_1m_2^2$
$-12093x_1x_2x_5m_1m_2^2-6694x_2^2x_5m_1m_2^2-12093x_1x_3x_5m_1m_2^2-12093x_2x_3x_5m_1m_2^2$
$-6694x_3^2x_5m_1m_2^2-12093x_1x_4x_5m_1m_2^2-12093x_2x_4x_5m_1m_2^2-12093x_3x_4x_5m_1m_2^2$
$-6694x_4^2x_5m_1m_2^2-6694x_1x_5^2m_1m_2^2-6694x_2x_5^2m_1m_2^2-6694x_3x_5^2m_1m_2^2$
$-6694x_4x_5^2m_1m_2^2-2663x_5^3m_1m_2^2+1748x_1^2m_1^2m_2^2+3190x_1x_2m_1^2m_2^2$
$+1748x_2^2m_1^2m_2^2+3190x_1x_3m_1^2m_2^2+3190x_2x_3m_1^2m_2^2+1748x_3^2m_1^2m_2^2$
$+3190x_1x_4m_1^2m_2^2+3190x_2x_4m_1^2m_2^2+3190x_3x_4m_1^2m_2^2+1748x_4^2m_1^2m_2^2$
$+3190x_1x_5m_1^2m_2^2+3190x_2x_5m_1^2m_2^2+3190x_3x_5m_1^2m_2^2+3190x_4x_5m_1^2m_2^2$
$+1748x_5^2m_1^2m_2^2-402x_1m_1^3m_2^2-402x_2m_1^3m_2^2-402x_3m_1^3m_2^2-402x_4m_1^3m_2^2$
$-402x_5m_1^3m_2^2+21m_1^4m_2^2-459x_1^3m_2^3-1152x_1^2x_2m_2^3-1152x_1x_2^2m_2^3$
$-459x_2^3m_2^3-1152x_1^2x_3m_2^3-2079x_1x_2x_3m_2^3-1152x_2^2x_3m_2^3-1152x_1x_3^2m_2^3$
$-1152x_2x_3^2m_2^3-459x_3^3m_2^3-1152x_1^2x_4m_2^3-2079x_1x_2x_4m_2^3-1152x_2^2x_4m_2^3$
$-2079x_1x_3x_4m_2^3-2079x_2x_3x_4m_2^3-1152x_3^2x_4m_2^3-1152x_1x_4^2m_2^3-1152x_2x_4^2m_2^3$
$-1152x_3x_4^2m_2^3-459x_4^3m_2^3-1152x_1^2x_5m_2^3-2079x_1x_2x_5m_2^3-1152x_2^2x_5m_2^3$
$-2079x_1x_3x_5m_2^3-2079x_2x_3x_5m_2^3-1152x_3^2x_5m_2^3-2079x_1x_4x_5m_2^3-2079x_2x_4x_5m_2^3$
$-2079x_3x_4x_5m_2^3-1152x_4^2x_5m_2^3-1152x_1x_5^2m_2^3-1152x_2x_5^2m_2^3-1152x_3x_5^2m_2^3$
$-1152x_4x_5^2m_2^3-459x_5^3m_2^3+798x_1^2m_1m_2^3+1458x_1x_2m_1m_2^3+798x_2^2m_1m_2^3$
$+1458x_1x_3m_1m_2^3+1458x_2x_3m_1m_2^3+798x_3^2m_1m_2^3+1458x_1x_4m_1m_2^3+1458x_2x_4m_1m_2^3$

$+1458x_3x_4m_1m_2^3+798x_4^2m_1m_2^3+1458x_1x_5m_1m_2^3+1458x_2x_5m_1m_2^3+1458x_3x_5m_1m_2^3$
$+1458x_4x_5m_1m_2^3+798x_5^2m_1m_2^3-402x_1m_1^2m_2^3-402x_2m_1^2m_2^3-402x_3m_1^2m_2^3$
$-402x_4m_1^2m_2^3-402x_5m_1^2m_2^3+54m_1^3m_2^3+54x_1^2m_2^4+99x_1x_2m_2^4+54x_2^2m_2^4$
$+99x_1x_3m_2^4+99x_2x_3m_2^4+54x_3^2m_2^4+99x_1x_4m_2^4+99x_2x_4m_2^4+99x_3x_4m_2^4$
$+54x_4^2m_2^4+99x_1x_5m_2^4+99x_2x_5m_2^4+99x_3x_5m_2^4+99x_4x_5m_2^4+54x_5^2m_2^4$
$-72x_1m_1m_2^4-72x_2m_1m_2^4-72x_3m_1m_2^4-72x_4m_1m_2^4-72x_5m_1m_2^4+21m_1^2m_2^4$
$-1516x_1^5m_3-5404x_1^4x_2m_3-9094x_1^3x_2^2m_3-9094x_1^2x_2^3m_3-5404x_1x_2^4m_3$
$-1516x_2^5m_3-5404x_1^4x_3m_3-16178x_1^3x_2x_3m_3$
$-22010x_1^2x_2^2x_3m_3-16178x_1x_2^3x_3m_3$
$-5404x_2^4x_3m_3-9094x_1^3x_3^2m_3-22010x_1^2x_2x_3^2m_3-22010x_1x_2^2x_3^2m_3-9094x_2^3x_3^2m_3$
$-9094x_1^2x_3^3m_3-16178x_1x_2x_3^3m_3-9094x_2^2x_3^3m_3-5404x_1x_3^4m_3-5404x_2x_3^4m_3$
$-1516x_3^5m_3-5404x_1^4x_4m_3-16178x_1^3x_2x_4m_3-22010x_1^2x_2^2x_4m_3-16178x_1x_2^3x_4m_3$
$-5404x_2^4x_4m_3-16178x_1^3x_3x_4m_3-38946x_1^2x_2x_3x_4m_3-38946x_1x_2^2x_3x_4m_3$
$-16178x_2^3x_3x_4m_3-22010x_1^2x_3^2x_4m_3-38946x_1x_2x_3^2x_4m_3-22010x_2^2x_3^2x_4m_3$
$-16178x_1x_3^3x_4m_3-16178x_2x_3^3x_4m_3-5404x_3^4x_4m_3-9094x_1^3x_4^2m_3$
$-22010x_1^2x_2x_4^2m_3-22010x_1x_2^2x_4^2m_3$
$-9094x_2^3x_4^2m_3-22010x_1^2x_3x_4^2m_3-38946x_1x_2x_3x_4^2m_3-22010x_2^2x_3x_4^2m_3$
$-22010x_1x_3^2x_4^2m_3-22010x_2x_3^2x_4^2m_3$
$-9094x_3^3x_4^2m_3-9094x_1^2x_4^3m_3$
$-16178x_1x_2x_4^3m_3-9094x_2^2x_4^3m_3-16178x_1x_3x_4^3m_3-16178x_2x_3x_4^3m_3$
$-9094x_3^2x_4^3m_3-5404x_1x_4^4m_3-5404x_2x_4^4m_3-5404x_3x_4^4m_3-1516x_4^5m_3$
$-5404x_1^4x_5m_3-16178x_1^3x_2x_5m_3-22010x_1^2x_2^2x_5m_3-16178x_1x_2^3x_5m_3-5404x_2^4x_5m_3$
$-16178x_1^3x_3x_5m_3-38946x_1^2x_2x_3x_5m_3-38946x_1x_2^2x_3x_5m_3-16178x_2^3x_3x_5m_3$
$-22010x_1^2x_3^2x_5m_3-38946x_1x_2x_3^2x_5m_3-22010x_2^2x_3^2x_5m_3-16178x_1x_3^3x_5m_3$
$-16178x_2x_3^3x_5m_3-5404x_3^4x_5m_3-16178x_1^3x_4x_5m_3-38946x_1^2x_2x_4x_5m_3$
$-38946x_1x_2^2x_4x_5m_3-16178x_2^3x_4x_5m_3-38946x_1^2x_3x_4x_5m_3-68700x_1x_2x_3x_4x_5m_3$
$-38946x_2^2x_3x_4x_5m_3-38946x_1x_3^2x_4x_5m_3-38946x_2x_3^2x_4x_5m_3-16178x_3^3x_4x_5m_3$
$-22010x_1^2x_4^2x_5m_3-38946x_1x_2x_4^2x_5m_3-22010x_2^2x_4^2x_5m_3-38946x_1x_3x_4^2x_5m_3$
$-38946x_2x_3x_4^2x_5m_3-22010x_3^2x_4^2x_5m_3-16178x_1x_4^3x_5m_3$
$-16178x_2x_4^3x_5m_3-16178x_3x_4^3x_5m_3$
$-5404x_4^4x_5m_3-9094x_1^3x_5^2m_3-22010x_1^2x_2x_5^2m_3-22010x_1x_2^2x_5^2m_3-9094x_2^3x_5^2m_3$
$-22010x_1^2x_3x_5^2m_3-38946x_1x_2x_3x_5^2m_3-22010x_2^2x_3x_5^2m_3-22010x_1x_3^2x_5^2m_3$
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$-22010x_2^2x_4x_5^2m_3-38946x_1x_3x_4x_5^2m_3-38946x_2x_3x_4x_5^2m_3-22010x_3^2x_4x_5^2m_3$
$-22010x_1x_4^2x_5^2m_3-22010x_2x_4^2x_5^2m_3-22010x_3x_4^2x_5^2m_3-9094x_4^3x_5^2m_3$
$-9094x_1^2x_5^3m_3-16178x_1x_2x_5^3m_3-9094x_2^2x_5^3m_3-16178x_1x_3x_5^3m_3-16178x_2x_3x_5^3m_3$
$-9094x_3^2x_5^3m_3-16178x_1x_4x_5^3m_3-16178x_2x_4x_5^3m_3-16178x_3x_4x_5^3m_3-9094x_4^2x_5^3m_3$
$-5404x_1x_5^4m_3-5404x_2x_5^4m_3-5404x_3x_5^4m_3-5404x_4x_5^4m_3-1516x_5^5m_3+3450x_1^4m_1m_3$
$+10664x_1^3x_2m_1m_3+14674x_1^2x_2^2m_1m_3+10664x_1x_2^3m_1m_3+3450x_2^4m_1m_3+10664x_1^3x_3m_1m_3$
$+26298x_1^2x_2x_3m_1m_3+26298x_1x_2^2x_3m_1m_3+10664x_2^3x_3m_1m_3+14674x_1^2x_3^2m_1m_3$
$+26298x_1x_2x_3^2m_1m_3+14674x_2^2x_3^2m_1m_3+10664x_1x_3^3m_1m_3+10664x_2x_3^3m_1m_3$

$+3450x_3^4m_1m_3+10664x_1^3x_4m_1m_3+26298x_1^2x_2x_4m_1m_3+26298x_1x_2^2x_4m_1m_3$
$+10664x_2^3x_4m_1m_3+26298x_1^2x_3x_4m_1m_3+47004x_1x_2x_3x_4m_1m_3+26298x_2^2x_3x_4m_1m_3$
$+26298x_1x_3^2x_4m_1m_3+26298x_2x_3^2x_4m_1m_3+10664x_3^3x_4m_1m_3+14674x_1^2x_4^2m_1m_3$
$+26298x_1x_2x_4^2m_1m_3+14674x_2^2x_4^2m_1m_3+26298x_1x_3x_4^2m_1m_3+26298x_2x_3x_4^2m_1m_3$
$+14674x_3^2x_4^2m_1m_3+10664x_1x_4^3m_1m_3+10664x_2x_4^3m_1m_3+10664x_3x_4^3m_1m_3$
$+3450x_4^4m_1m_3+10664x_1^3x_5m_1m_3+26298x_1^2x_2x_5m_1m_3+26298x_1x_2^2x_5m_1m_3$
$+10664x_2^3x_5m_1m_3+26298x_1^2x_3x_5m_1m_3+47004x_1x_2x_3x_5m_1m_3+26298x_2^2x_3x_5m_1m_3$
$+26298x_1x_3^2x_5m_1m_3+26298x_2x_3^2x_5m_1m_3+10664x_3^3x_5m_1m_3$
$+26298x_1^2x_4x_5m_1m_3+47004x_1x_2x_4x_5m_1m_3+26298x_2^2x_4x_5m_1m_3+47004x_1x_3x_4x_5m_1m_3$
$+47004x_2x_3x_4x_5m_1m_3+26298x_3^2x_4x_5m_1m_3+26298x_1x_4^2x_5m_1m_3$
$+26298x_2x_4^2x_5m_1m_3+26298x_3x_4^2x_5m_1m_3$
$+10664x_4^3x_5m_1m_3+14674x_1^2x_5^2m_1m_3+26298x_1x_2x_5^2m_1m_3$
$+14674x_2^2x_5^2m_1m_3+26298x_1x_3x_5^2m_1m_3+26298x_2x_3x_5^2m_1m_3$
$+14674x_3^2x_5^2m_1m_3+26298x_1x_4x_5^2m_1m_3+26298x_2x_4x_5^2m_1m_3+26298x_3x_4x_5^2m_1m_3$
$+14674x_4^2x_5^2m_1m_3+10664x_1x_5^3m_1m_3+10664x_2x_5^3m_1m_3$
$+10664x_3x_5^3m_1m_3+10664x_4x_5^3m_1m_3$
$+3450x_5^4m_1m_3-2663x_1^3m_1^2m_3-6694x_1^2x_2m_1^2m_3-6694x_1x_2^2m_1^2m_3$
$-2663x_2^3m_1^2m_3-6694x_1^2x_3m_1^2m_3$
$-12093x_1x_2x_3m_1^2m_3-6694x_2^2x_3m_1^2m_3-6694x_1x_3^2m_1^2m_3$
$-6694x_2x_3^2m_1^2m_3-2663x_3^3m_1^2m_3$
$-6694x_1^2x_4m_1^2m_3-12093x_1x_2x_4m_1^2m_3-6694x_2^2x_4m_1^2m_3-$
$12093x_1x_3x_4m_1^2m_3-12093x_2x_3x_4m_1^2m_3$
$-6694x_3^2x_4m_1^2m_3-6694x_1x_4^2m_1^2m_3-6694x_2x_4^2m_1^2m_3$
$-6694x_3x_4^2m_1^2m_3-2663x_4^3m_1^2m_3-6694x_1^2x_5m_1^2m_3-12093x_1x_2x_5m_1^2m_3$
$-6694x_2^2x_5m_1^2m_3-12093x_1x_3x_5m_1^2m_3-12093x_2x_3x_5m_1^2m_3$
$-6694x_3^2x_5m_1^2m_3-12093x_1x_4x_5m_1^2m_3-12093x_2x_4x_5m_1^2m_3-12093x_3x_4x_5m_1^2m_3-6694x_4^2x_5m_1^2m_3$
$-6694x_1x_5^2m_1^2m_3-6694x_2x_5^2m_1^2m_3-6694x_3x_5^2m_1^2m_3$
$-6694x_4x_5^2m_1^2m_3-2663x_5^3m_1^2m_3$
$+798x_1^2m_1^3m_3+1458x_1x_2m_1^3m_3+798x_2^2m_1^3m_3+1458x_1x_3m_1^3m_3$
$+1458x_2x_3m_1^3m_3+798x_3^2m_1^3m_3+1458x_1x_4m_1^3m_3+1458x_2x_4m_1^3m_3+1458x_3x_4m_1^3m_3$
$+798x_4^2m_1^3m_3+1458x_1x_5m_1^3m_3+1458x_2x_5m_1^3m_3+1458x_3x_5m_1^3m_3$
$+1458x_4x_5m_1^3m_3+798x_5^2m_1^3m_3-72x_1m_1^4m_3-72x_2m_1^4m_3$
$-72x_3m_1^4m_3-72x_4m_1^4m_3-72x_5m_1^4m_3$
$+3450x_1^4m_2m_3+10664x_1^3x_2m_2m_3+14674x_1^2x_2^2m_2m_3+10664x_1x_2^3m_2m_3+3450x_2^4m_2m_3$
$+10664x_1^3x_3m_2m_3+26298x_1^2x_2x_3m_2m_3+26298x_1x_2^2x_3m_2m_3$
$+10664x_2^3x_3m_2m_3+14674x_1^2x_3^2m_2m_3+26298x_1x_2x_3^2m_2m_3+14674x_2^2x_3^2m_2m_3$
$+10664x_1x_3^3m_2m_3+10664x_2x_3^3m_2m_3+3450x_3^4m_2m_3+10664x_1^3x_4m_2m_3$
$+26298x_1^2x_2x_4m_2m_3+26298x_1x_2^2x_4m_2m_3+10664x_2^3x_4m_2m_3+26298x_1^2x_3x_4m_2m_3$
$+47004x_1x_2x_3x_4m_2m_3+26298x_2^2x_3x_4m_2m_3+26298x_1x_3^2x_4m_2m_3$
$+26298x_2x_3^2x_4m_2m_3+10664x_3^3x_4m_2m_3$
$+14674x_1^2x_4^2m_2m_3+26298x_1x_2x_4^2m_2m_3+14674x_2^2x_4^2m_2m_3$

$+26298x_1x_3x_4^2m_2m_3+26298x_2x_3x_4^2m_2m_3$
$+14674x_3^2x_4^2m_2m_3+10664x_1x_4^3m_2m_3+10664x_2x_4^3m_2m_3$
$+10664x_3x_4^3m_2m_3+3450x_4^4m_2m_3$
$+10664x_1^3x_5m_2m_3+26298x_1^2x_2x_5m_2m_3+26298x_1x_2^2x_5m_2m_3$
$+10664x_2^3x_5m_2m_3+26298x_1^2x_3x_5m_2m_3$
$+47004x_1x_2x_3x_5m_2m_3+26298x_2^2x_3x_5m_2m_3+26298x_1x_3^2x_5m_2m_3$
$+26298x_2x_3^2x_5m_2m_3+10664x_3^3x_5m_2m_3$
$+26298x_1^2x_4x_5m_2m_3+47004x_1x_2x_4x_5m_2m_3+26298x_2^2x_4x_5m_2m_3+47004x_1x_3x_4x_5m_2m_3$
$+47004x_2x_3x_4x_5m_2m_3+26298x_3^2x_4x_5m_2m_3$
$+26298x_1x_4^2x_5m_2m_3+26298x_2x_4^2x_5m_2m_3$
$+26298x_3x_4^2x_5m_2m_3+10664x_4^3x_5m_2m_3+14674x_1^2x_5^2m_2m_3+26298x_1x_2x_5^2m_2m_3$
$+14674x_2^2x_5^2m_2m_3+26298x_1x_3x_5^2m_2m_3+26298x_2x_3x_5^2m_2m_3+14674x_3^2x_5^2m_2m_3$
$+26298x_1x_4x_5^2m_2m_3+26298x_2x_4x_5^2m_2m_3+26298x_3x_4x_5^2m_2m_3+14674x_4^2x_5^2m_2m_3$
$+10664x_1x_5^3m_2m_3+10664x_2x_5^3m_2m_3+10664x_3x_5^3m_2m_3+10664x_4x_5^3m_2m_3$
$+3450x_5^4m_2m_3-6912x_1^3m_1m_2m_3-17390x_1^2x_2m_1m_2m_3-17390x_1x_2^2m_1m_2m_3$
$-6912x_2^3m_1m_2m_3-17390x_1^2x_3m_1m_2m_3-31434x_1x_2x_3m_1m_2m_3-17390x_2^2x_3m_1m_2m_3$
$-17390x_1x_3^2m_1m_2m_3-17390x_2x_3^2m_1m_2m_3-6912x_3^3m_1m_2m_3$
$-17390x_1^2x_4m_1m_2m_3-31434x_1x_2x_4m_1m_2m_3-17390x_2^2x_4m_1m_2m_3-31434x_1x_3x_4m_1m_2m_3$
$-31434x_2x_3x_4m_1m_2m_3-17390x_3^2x_4m_1m_2m_3-17390x_1x_4^2m_1m_2m_3-17390x_2x_4^2m_1m_2m_3$
$-17390x_3x_4^2m_1m_2m_3-6912x_4^3m_1m_2m_3-17390x_1^2x_5m_1m_2m_3-31434x_1x_2x_5m_1m_2m_3$
$-17390x_2^2x_5m_1m_2m_3-31434x_1x_3x_5m_1m_2m_3-31434x_2x_3x_5m_1m_2m_3$
$-17390x_3^2x_5m_1m_2m_3-31434x_1x_4x_5m_1m_2m_3-31434x_2x_4x_5m_1m_2m_3$
$-31434x_3x_4x_5m_1m_2m_3-17390x_4^2x_5m_1m_2m_3-17390x_1x_5^2m_1m_2m_3$
$-17390x_2x_5^2m_1m_2m_3-17390x_3x_5^2m_1m_2m_3$
$-17390x_4x_5^2m_1m_2m_3-6912x_5^3m_1m_2m_3+4452x_1^2m_1^2m_2m_3+8122x_1x_2m_1^2m_2m_3$
$+4452x_2^2m_1^2m_2m_3+8122x_1x_3m_1^2m_2m_3+8122x_2x_3m_1^2m_2m_3+4452x_3^2m_1^2m_2m_3$
$+8122x_1x_4m_1^2m_2m_3+8122x_2x_4m_1^2m_2m_3+8122x_3x_4m_1^2m_2m_3+4452x_4^2m_1^2m_2m_3$
$+8122x_1x_5m_1^2m_2m_3+8122x_2x_5m_1^2m_2m_3+8122x_3x_5m_1^2m_2m_3+8122x_4x_5m_1^2m_2m_3$
$+4452x_5^2m_1^2m_2m_3-1002x_1m_1^3m_2m_3-1002x_2m_1^3m_2m_3-1002x_3m_1^3m_2m_3$
$-1002x_4m_1^3m_2m_3-1002x_5m_1^3m_2m_3+51m_1^4m_2m_3-2663x_1^3m_2^2m_3-6694x_1^2x_2m_2^2m_3$
$-6694x_1x_2^2m_2^2m_3-2663x_2^3m_2^2m_3-6694x_1^2x_3m_2^2m_3-12093x_1x_2x_3m_2^2m_3$
$-6694x_2^2x_3m_2^2m_3-6694x_1x_3^2m_2^2m_3-6694x_2x_3^2m_2^2m_3-2663x_3^3m_2^2m_3$
$-6694x_1^2x_4m_2^2m_3-12093x_1x_2x_4m_2^2m_3-6694x_2^2x_4m_2^2m_3-12093x_1x_3x_4m_2^2m_3$
$-12093x_2x_3x_4m_2^2m_3-6694x_3^2x_4m_2^2m_3-6694x_1x_4^2m_2^2m_3-6694x_2x_4^2m_2^2m_3$
$-6694x_3x_4^2m_2^2m_3-2663x_4^3m_2^2m_3-6694x_1^2x_5m_2^2m_3-12093x_1x_2x_5m_2^2m_3$
$-6694x_2^2x_5m_2^2m_3-12093x_1x_3x_5m_2^2m_3-12093x_2x_3x_5m_2^2m_3$
$-6694x_3^2x_5m_2^2m_3-12093x_1x_4x_5m_2^2m_3-12093x_2x_4x_5m_2^2m_3-12093x_3x_4x_5m_2^2m_3$
$-6694x_4^2x_5m_2^2m_3-6694x_1x_5^2m_2^2m_3-6694x_2x_5^2m_2^2m_3-6694x_3x_5^2m_2^2m_3$
$-6694x_4x_5^2m_2^2m_3-2663x_5^3m_2^2m_3+4452x_1^2m_1m_2^2m_3+8122x_1x_2m_1m_2^2m_3$
$+4452x_2^2m_1m_2^2m_3+8122x_1x_3m_1m_2^2m_3+8122x_2x_3m_1m_2^2m_3$
$+4452x_3^2m_1m_2^2m_3+8122x_1x_4m_1m_2^2m_3+8122x_2x_4m_1m_2^2m_3+8122x_3x_4m_1m_2^2m_3$

$+4452x_4^2m_1m_2^2m_3+8122x_1x_5m_1m_2^2m_3+8122x_2x_5m_1m_2^2m_3+8122x_3x_5m_1m_2^2m_3$
$+8122x_4x_5m_1m_2^2m_3+4452x_5^2m_1m_2^2m_3-2158x_1m_1^2m_2^2m_3$
$-2158x_2m_1^2m_2^2m_3-2158x_3m_1^2m_2^2m_3-2158x_4m_1^2m_2^2m_3$
$-2158x_5m_1^2m_2^2m_3+279m_1^3m_2^2m_3+798x_1^2m_2^3m_3+1458x_1x_2m_2^3m_3+798x_2^2m_2^3m_3$
$+1458x_1x_3m_2^3m_3+1458x_2x_3m_2^3m_3+798x_3^2m_2^3m_3+1458x_1x_4m_2^3m_3+1458x_2x_4m_2^3m_3$
$+1458x_3x_4m_2^3m_3+798x_4^2m_2^3m_3+1458x_1x_5m_2^3m_3+1458x_2x_5m_2^3m_3$
$+1458x_3x_5m_2^3m_3+1458x_4x_5m_2^3m_3$
$+798x_5^2m_2^3m_3-1002x_1m_1m_2^3m_3-1002x_2m_1m_2^3m_3-1002x_3m_1m_2^3m_3$
$-1002x_4m_1m_2^3m_3-1002x_5m_1m_2^3m_3$
$+279m_1^2m_2^3m_3-72x_1m_2^4m_3-72x_2m_2^4m_3-72x_3m_2^4m_3-72x_4m_2^4m_3-72x_5m_2^4m_3$
$+51m_1m_2^4m_3+1305x_1^4m_3^2+4020x_1^3x_2m_3^2+5523x_1^2x_2^2m_3^2+4020x_1x_2^3m_3^2$
$+1305x_2^4m_3^2+4020x_1^3x_3m_3^2+9883x_1^2x_2x_3m_3^2+9883x_1x_2^2x_3m_3^2+4020x_2^3x_3m_3^2$
$+5523x_1^2x_3^2m_3^2+9883x_1x_2x_3^2m_3^2+5523x_2^2x_3^2m_3^2+4020x_1x_3^3m_3^2+4020x_2x_3^3m_3^2$
$+1305x_3^4m_3^2+4020x_1^3x_4m_3^2$
$+9883x_1^2x_2x_4m_3^2+9883x_1x_2^2x_4m_3^2+4020x_2^3x_4m_3^2+9883x_1^2x_3x_4m_3^2$
$+17634x_1x_2x_3x_4m_3^2+9883x_2^2x_3x_4m_3^2+9883x_1x_3^2x_4m_3^2+9883x_2x_3^2x_4m_3^2$
$+4020x_3^3x_4m_3^2+5523x_1^2x_4^2m_3^2+9883x_1x_2x_4^2m_3^2$
$+5523x_2^2x_4^2m_3^2+9883x_1x_3x_4^2m_3^2+9883x_2x_3x_4^2m_3^2+5523x_3^2x_4^2m_3^2$
$+4020x_1x_4^3m_3^2+4020x_2x_4^3m_3^2+4020x_3x_4^3m_3^2+1305x_4^4m_3^2+4020x_1^3x_5m_3^2$
$+9883x_1^2x_2x_5m_3^2+9883x_1x_2^2x_5m_3^2$
$+4020x_2^3x_5m_3^2+9883x_1^2x_3x_5m_3^2+17634x_1x_2x_3x_5m_3^2+9883x_2^2x_3x_5m_3^2$
$+9883x_1x_3^2x_5m_3^2+9883x_2x_3^2x_5m_3^2+4020x_3^3x_5m_3^2+9883x_1^2x_4x_5m_3^2$
$+17634x_1x_2x_4x_5m_3^2+9883x_2^2x_4x_5m_3^2+17634x_1x_3x_4x_5m_3^2+17634x_2x_3x_4x_5m_3^2$
$+9883x_3^2x_4x_5m_3^2+9883x_1x_4^2x_5m_3^2+9883x_2x_4^2x_5m_3^2+9883x_3x_4^2x_5m_3^2$
$+4020x_4^3x_5m_3^2+5523x_1^2x_5^2m_3^2+9883x_1x_2x_5^2m_3^2+5523x_2^2x_5^2m_3^2$
$+9883x_1x_3x_5^2m_3^2+9883x_2x_3x_5^2m_3^2+5523x_3^2x_5^2m_3^2+9883x_1x_4x_5^2m_3^2$
$+9883x_2x_4x_5^2m_3^2+9883x_3x_4x_5^2m_3^2+5523x_4^2x_5^2m_3^2$
$+4020x_1x_5^3m_3^2+4020x_2x_5^3m_3^2+4020x_3x_5^3m_3^2+4020x_4x_5^3m_3^2+1305x_5^4m_3^2$
$-2663x_1^3m_1m_3^2-6694x_1^2x_2m_1m_3^2-6694x_1x_2^2m_1m_3^2-2663x_2^3m_1m_3^2$
$-6694x_1^2x_3m_1m_3^2-12093x_1x_2x_3m_1m_3^2$
$-6694x_2^2x_3m_1m_3^2-6694x_1x_3^2m_1m_3^2-6694x_2x_3^2m_1m_3^2-2663x_3^3m_1m_3^2$
$-6694x_1^2x_4m_1m_3^2-12093x_1x_2x_4m_1m_3^2-6694x_2^2x_4m_1m_3^2-12093x_1x_3x_4m_1m_3^2$
$-12093x_2x_3x_4m_1m_3^2-6694x_3^2x_4m_1m_3^2-6694x_1x_4^2m_1m_3^2-6694x_2x_4^2m_1m_3^2$
$-6694x_3x_4^2m_1m_3^2-2663x_4^3m_1m_3^2-6694x_1^2x_5m_1m_3^2$
$-12093x_1x_2x_5m_1m_3^2-6694x_2^2x_5m_1m_3^2-12093x_1x_3x_5m_1m_3^2-12093x_2x_3x_5m_1m_3^2$
$-6694x_3^2x_5m_1m_3^2-12093x_1x_4x_5m_1m_3^2-12093x_2x_4x_5m_1m_3^2-12093x_3x_4x_5m_1m_3^2$
$-6694x_4^2x_5m_1m_3^2-6694x_1x_5^2m_1m_3^2-6694x_2x_5^2m_1m_3^2$
$-6694x_3x_5^2m_1m_3^2-6694x_4x_5^2m_1m_3^2$
$-2663x_5^3m_1m_3^2+1748x_1^2m_1^2m_3^2+3190x_1x_2m_1^2m_3^2+1748x_2^2m_1^2m_3^2$
$+3190x_1x_3m_1^2m_3^2+3190x_2x_3m_1^2m_3^2+1748x_3^2m_1^2m_3^2+3190x_1x_4m_1^2m_3^2$
$+3190x_2x_4m_1^2m_3^2+3190x_3x_4m_1^2m_3^2+1748x_4^2m_1^2m_3^2+3190x_1x_5m_1^2m_3^2$

$+3190x_2x_5m_1^2m_3^2+3190x_3x_5m_1^2m_3^2+3190x_4x_5m_1^2m_3^2+1748x_5^2m_1^2m_3^2$
$-402x_1m_1^3m_3^2-402x_2m_1^3m_3^2-402x_3m_1^3m_3^2-402x_4m_1^3m_3^2-402x_5m_1^3m_3^2$
$+21m_1^4m_3^2-2663x_1^3m_2m_3^2-6694x_1^2x_2m_2m_3^2-6694x_1x_2^2m_2m_3^2-2663x_2^3m_2m_3^2$
$-6694x_1^2x_3m_2m_3^2-12093x_1x_2x_3m_2m_3^2-6694x_2^2x_3m_2m_3^2-6694x_1x_3^2m_2m_3^2$
$-6694x_2x_3^2m_2m_3^2-2663x_3^3m_2m_3^2-6694x_1^2x_4m_2m_3^2-12093x_1x_2x_4m_2m_3^2$
$-6694x_2^2x_4m_2m_3^2-12093x_1x_3x_4m_2m_3^2-12093x_2x_3x_4m_2m_3^2-6694x_3^2x_4m_2m_3^2$
$-6694x_1x_4^2m_2m_3^2-6694x_2x_4^2m_2m_3^2-6694x_3x_4^2m_2m_3^2-2663x_4^3m_2m_3^2$
$-6694x_1^2x_5m_2m_3^2-12093x_1x_2x_5m_2m_3^2-6694x_2^2x_5m_2m_3^2-12093x_1x_3x_5m_2m_3^2$
$-12093x_2x_3x_5m_2m_3^2-6694x_3^2x_5m_2m_3^2-12093x_1x_4x_5m_2m_3^2-12093x_2x_4x_5m_2m_3^2$
$-12093x_3x_4x_5m_2m_3^2-6694x_4^2x_5m_2m_3^2-6694x_1x_5^2m_2m_3^2-6694x_2x_5^2m_2m_3^2$
$-6694x_3x_5^2m_2m_3^2-6694x_4x_5^2m_2m_3^2-2663x_5^3m_2m_3^2+4452x_1^2m_1m_2m_3^2$
$+8122x_1x_2m_1m_2m_3^2+4452x_2^2m_1m_2m_3^2+8122x_1x_3m_1m_2m_3^2+8122x_2x_3m_1m_2m_3^2$
$+4452x_3^2m_1m_2m_3^2+8122x_1x_4m_1m_2m_3^2+8122x_2x_4m_1m_2m_3^2+8122x_3x_4m_1m_2m_3^2$
$+4452x_4^2m_1m_2m_3^2+8122x_1x_5m_1m_2m_3^2+8122x_2x_5m_1m_2m_3^2+8122x_3x_5m_1m_2m_3^2$
$+8122x_4x_5m_1m_2m_3^2+4452x_5^2m_1m_2m_3^2-2158x_1m_1^2m_2m_3^2-2158x_2m_1^2m_2m_3^2$
$-2158x_3m_1^2m_2m_3^2-2158x_4m_1^2m_2m_3^2-2158x_5m_1^2m_2m_3^2+279m_1^3m_2m_3^2$
$+1748x_1^2m_2^2m_3^2+3190x_1x_2m_2^2m_3^2+1748x_2^2m_2^2m_3^2+3190x_1x_3m_2^2m_3^2$
$+3190x_2x_3m_2^2m_3^2+1748x_3^2m_2^2m_3^2+3190x_1x_4m_2^2m_3^2+3190x_2x_4m_2^2m_3^2$
$+3190x_3x_4m_2^2m_3^2+1748x_4^2m_2^2m_3^2+3190x_1x_5m_2^2m_3^2+3190x_2x_5m_2^2m_3^2$
$+3190x_3x_5m_2^2m_3^2+3190x_4x_5m_2^2m_3^2+1748x_5^2m_2^2m_3^2-2158x_1m_1m_2^2m_3^2$
$-2158x_2m_1m_2^2m_3^2-2158x_3m_1m_2^2m_3^2-2158x_4m_1m_2^2m_3^2-2158x_5m_1m_2^2m_3^2$
$+593m_1^2m_2^2m_3^2-402x_1m_2^3m_3^2-402x_2m_2^3m_3^2-402x_3m_2^3m_3^2-402x_4m_2^3m_3^2$
$-402x_5m_2^3m_3^2+279m_1m_2^3m_3^2+21m_2^4m_3^2-459x_1^3m_3^3-1152x_1^2x_2m_3^3$
$-1152x_1x_2^2m_3^3-459x_2^3m_3^3-1152x_1^2x_3m_3^3-2079x_1x_2x_3m_3^3-1152x_2^2x_3m_3^3$
$-1152x_1x_3^2m_3^3-1152x_2x_3^2m_3^3-459x_3^3m_3^3-1152x_1^2x_4m_3^3-2079x_1x_2x_4m_3^3$
$-1152x_2^2x_4m_3^3-2079x_1x_3x_4m_3^3-2079x_2x_3x_4m_3^3$
$-1152x_3^2x_4m_3^3-1152x_1x_4^2m_3^3-1152x_2x_4^2m_3^3$
$-1152x_3x_4^2m_3^3-459x_4^3m_3^3-1152x_1^2x_5m_3^3-2079x_1x_2x_5m_3^3-1152x_2^2x_5m_3^3$
$-2079x_1x_3x_5m_3^3-2079x_2x_3x_5m_3^3-1152x_3^2x_5m_3^3-2079x_1x_4x_5m_3^3-2079x_2x_4x_5m_3^3$
$-2079x_3x_4x_5m_3^3-1152x_4^2x_5m_3^3-1152x_1x_5^2m_3^3-1152x_2x_5^2m_3^3-1152x_3x_5^2m_3^3$
$-1152x_4x_5^2m_3^3-459x_5^3m_3^3$
$+798x_1^2m_1m_3^3+1458x_1x_2m_1m_3^3+798x_2^2m_1m_3^3+1458x_1x_3m_1m_3^3+1458x_2x_3m_1m_3^3$
$+798x_3^2m_1m_3^3+1458x_1x_4m_1m_3^3+1458x_2x_4m_1m_3^3+1458x_3x_4m_1m_3^3$
$+798x_4^2m_1m_3^3+1458x_1x_5m_1m_3^3+1458x_2x_5m_1m_3^3+1458x_3x_5m_1m_3^3$
$+1458x_4x_5m_1m_3^3+798x_5^2m_1m_3^3$
$-402x_1m_1^2m_3^3-402x_2m_1^2m_3^3-402x_3m_1^2m_3^3-402x_4m_1^2m_3^3-402x_5m_1^2m_3^3$
$+54m_1^3m_3^3+798x_1^2m_2m_3^3+1458x_1x_2m_2m_3^3+798x_2^2m_2m_3^3+1458x_1x_3m_2m_3^3$
$+1458x_2x_3m_2m_3^3+798x_3^2m_2m_3^3+1458x_1x_4m_2m_3^3+1458x_2x_4m_2m_3^3+1458x_3x_4m_2m_3^3$
$+798x_4^2m_2m_3^3+1458x_1x_5m_2m_3^3+1458x_2x_5m_2m_3^3$
$+1458x_3x_5m_2m_3^3+1458x_4x_5m_2m_3^3+798x_5^2m_2m_3^3$
$-1002x_1m_1m_2m_3^3-1002x_2m_1m_2m_3^3-1002x_3m_1m_2m_3^3-1002x_4m_1m_2m_3^3$

$$-1002x_5m_1m_2m_3^3+279m_1^2m_2m_3^3-402x_1m_2^2m_3^3-402x_2m_2^2m_3^3-402x_3m_2^2m_3^3$$
$$-402x_4m_2^2m_3^3-402x_5m_2^2m_3^3+279m_1m_2^2m_3^3+54m_2^3m_3^3+54x_1^2m_3^4+99x_1x_2m_3^4$$
$$+54x_2^2m_3^4+99x_1x_3m_3^4+99x_2x_3m_3^4+54x_3^2m_3^4+99x_1x_4m_3^4$$
$$+99x_2x_4m_3^4+99x_3x_4m_3^4+54x_4^2m_3^4$$
$$+99x_1x_5m_3^4+99x_2x_5m_3^4+99x_3x_5m_3^4+99x_4x_5m_3^4+54x_5^2m_3^4-72x_1m_1m_3^4$$
$$-72x_2m_1m_3^4-72x_3m_1m_3^4-72x_4m_1m_3^4-72x_5m_1m_3^4+21m_1^2m_3^4-72x_1m_2m_3^4$$
$$-72x_2m_2m_3^4-72x_3m_2m_3^4-72x_4m_2m_3^4-72x_5m_2m_3^4$$
$$+51m_1m_2m_3^4+21m_2^2m_3^4-1516x_1^5m_4-5404x_1^4x_2m_4-9094x_1^3x_2^2m_4-9094x_1^2x_2^3m_4$$
$$-5404x_1x_2^4m_4-1516x_2^5m_4-5404x_1^4x_3m_4-16178x_1^3x_2x_3m_4-22010x_1^2x_2^2x_3m_4$$
$$-16178x_1x_2^3x_3m_4-5404x_2^4x_3m_4-9094x_1^3x_3^2m_4-22010x_1^2x_2x_3^2m_4-22010x_1x_2^2x_3^2m_4$$
$$-9094x_2^3x_3^2m_4-9094x_1^2x_3^3m_4-16178x_1x_2x_3^3m_4-9094x_2^2x_3^3m_4-5404x_1x_3^4m_4$$
$$-5404x_2x_3^4m_4-1516x_3^5m_4-5404x_1^4x_4m_4-16178x_1^3x_2x_4m_4-22010x_1^2x_2^2x_4m_4$$
$$-16178x_1x_2^3x_4m_4-5404x_2^4x_4m_4-16178x_1^3x_3x_4m_4$$
$$-38946x_1^2x_2x_3x_4m_4-38946x_1x_2^2x_3x_4m_4-16178x_2^3x_3x_4m_4-22010x_1^2x_3^2x_4m_4$$
$$-38946x_1x_2x_3^2x_4m_4-22010x_2^2x_3^2x_4m_4-16178x_1x_3^3x_4m_4$$
$$-16178x_2x_3^3x_4m_4-5404x_3^4x_4m_4$$
$$-9094x_1^3x_4^2m_4-22010x_1^2x_2x_4^2m_4-22010x_1x_2^2x_4^2m_4-9094x_2^3x_4^2m_4$$
$$-22010x_1^2x_3x_4^2m_4-38946x_1x_2x_3x_4^2m_4-22010x_2^2x_3x_4^2m_4-22010x_1x_3^2x_4^2m_4$$
$$-22010x_2x_3^2x_4^2m_4-9094x_3^3x_4^2m_4$$
$$-9094x_1^2x_4^3m_4-16178x_1x_2x_4^3m_4-9094x_2^2x_4^3m_4-16178x_1x_3x_4^3m_4-16178x_2x_3x_4^3m_4$$
$$-9094x_3^2x_4^3m_4-5404x_1x_4^4m_4-5404x_2x_4^4m_4-5404x_3x_4^4m_4$$
$$-1516x_4^5m_4-5404x_1^4x_5m_4-16178x_1^3x_2x_5m_4$$
$$-22010x_1^2x_2^2x_5m_4-16178x_1x_2^3x_5m_4-5404x_2^4x_5m_4-16178x_1^3x_3x_5m_4$$
$$-38946x_1^2x_2x_3x_5m_4-38946x_1x_2^2x_3x_5m_4-16178x_2^3x_3x_5m_4-22010x_1^2x_3^2x_5m_4$$
$$-38946x_1x_2x_3^2x_5m_4-22010x_2^2x_3^2x_5m_4-16178x_1x_3^3x_5m_4-16178x_2x_3^3x_5m_4$$
$$-5404x_3^4x_5m_4-16178x_1^3x_4x_5m_4-38946x_1^2x_2x_4x_5m_4-38946x_1x_2^2x_4x_5m_4$$
$$-16178x_2^3x_4x_5m_4-38946x_1^2x_3x_4x_5m_4-68700x_1x_2x_3x_4x_5m_4-38946x_2^2x_3x_4x_5m_4$$
$$-38946x_1x_3^2x_4x_5m_4-38946x_2x_3^2x_4x_5m_4-16178x_3^3x_4x_5m_4-22010x_1^2x_4^2x_5m_4$$
$$-38946x_1x_2x_4^2x_5m_4-22010x_2^2x_4^2x_5m_4-38946x_1x_3x_4^2x_5m_4-38946x_2x_3x_4^2x_5m_4$$
$$-22010x_3^2x_4^2x_5m_4-16178x_1x_4^3x_5m_4-16178x_2x_4^3x_5m_4-16178x_3x_4^3x_5m_4$$
$$-5404x_4^4x_5m_4-9094x_1^3x_5^2m_4-22010x_1^2x_2x_5^2m_4$$
$$-22010x_1x_2^2x_5^2m_4-9094x_2^3x_5^2m_4-22010x_1^2x_3x_5^2m_4$$
$$-38946x_1x_2x_3x_5^2m_4-22010x_2^2x_3x_5^2m_4-22010x_1x_3^2x_5^2m_4-22010x_2x_3^2x_5^2m_4$$
$$-9094x_3^3x_5^2m_4-22010x_1^2x_4x_5^2m_4-38946x_1x_2x_4x_5^2m_4-22010x_2^2x_4x_5^2m_4$$
$$-38946x_1x_3x_4x_5^2m_4-38946x_2x_3x_4x_5^2m_4-22010x_3^2x_4x_5^2m_4-22010x_1x_4^2x_5^2m_4$$
$$-22010x_2x_4^2x_5^2m_4-22010x_3x_4^2x_5^2m_4-9094x_4^3x_5^2m_4-9094x_1^2x_5^3m_4$$
$$-16178x_1x_2x_5^3m_4-9094x_2^2x_5^3m_4-16178x_1x_3x_5^3m_4$$
$$-16178x_2x_3x_5^3m_4-9094x_3^2x_5^3m_4-16178x_1x_4x_5^3m_4$$
$$-16178x_2x_4x_5^3m_4-16178x_3x_4x_5^3m_4-9094x_4^2x_5^3m_4$$
$$-5404x_1x_5^4m_4-5404x_2x_5^4m_4-5404x_3x_5^4m_4-5404x_4x_5^4m_4-1516x_5^5m_4+3450x_1^4m_1m_4$$
$$+10664x_1^3x_2m_1m_4+14674x_1^2x_2^2m_1m_4+10664x_1x_2^3m_1m_4+3450x_2^4m_1m_4$$

$+10664x_1^3x_3m_1m_4+26298x_1^2x_2x_3m_1m_4+26298x_1x_2^2x_3m_1m_4+10664x_2^3x_3m_1m_4$
$+14674x_1^2x_3^2m_1m_4+26298x_1x_2x_3^2m_1m_4+14674x_2^2x_3^2m_1m_4+10664x_1x_3^3m_1m_4$
$+10664x_2x_3^3m_1m_4+3450x_3^4m_1m_4+10664x_1^3x_4m_1m_4+26298x_1^2x_2x_4m_1m_4$
$+26298x_1x_2^2x_4m_1m_4+10664x_2^3x_4m_1m_4+26298x_1^2x_3x_4m_1m_4+47004x_1x_2x_3x_4m_1m_4$
$+26298x_2^2x_3x_4m_1m_4+26298x_1x_3^2x_4m_1m_4+26298x_2x_3^2x_4m_1m_4+10664x_3^3x_4m_1m_4$
$+14674x_1^2x_4^2m_1m_4+26298x_1x_2x_4^2m_1m_4+14674x_2^2x_4^2m_1m_4$
$+26298x_1x_3x_4^2m_1m_4+26298x_2x_3x_4^2m_1m_4+14674x_3^2x_4^2m_1m_4+10664x_1x_4^3m_1m_4$
$+10664x_2x_4^3m_1m_4+10664x_3x_4^3m_1m_4+3450x_4^4m_1m_4+10664x_1^3x_5m_1m_4$
$+26298x_1^2x_2x_5m_1m_4+26298x_1x_2^2x_5m_1m_4+10664x_2^3x_5m_1m_4+26298x_1^2x_3x_5m_1m_4$
$+47004x_1x_2x_3x_5m_1m_4+26298x_2^2x_3x_5m_1m_4+26298x_1x_3^2x_5m_1m_4+26298x_2x_3^2x_5m_1m_4$
$+10664x_3^3x_5m_1m_4+26298x_1^2x_4x_5m_1m_4$
$+47004x_1x_2x_4x_5m_1m_4+26298x_2^2x_4x_5m_1m_4+47004x_1x_3x_4x_5m_1m_4+47004x_2x_3x_4x_5m_1m_4$
$+26298x_3^2x_4x_5m_1m_4+26298x_1x_4^2x_5m_1m_4+26298x_2x_4^2x_5m_1m_4+26298x_3x_4^2x_5m_1m_4$
$+10664x_4^3x_5m_1m_4+14674x_1^2x_5^2m_1m_4+26298x_1x_2x_5^2m_1m_4+14674x_2^2x_5^2m_1m_4$
$+26298x_1x_3x_5^2m_1m_4+26298x_2x_3x_5^2m_1m_4+14674x_3^2x_5^2m_1m_4+26298x_1x_4x_5^2m_1m_4$
$+26298x_2x_4x_5^2m_1m_4+26298x_3x_4x_5^2m_1m_4$
$+14674x_4^2x_5^2m_1m_4+10664x_1x_5^3m_1m_4+10664x_2x_5^3m_1m_4+10664x_3x_5^3m_1m_4$
$+10664x_4x_5^3m_1m_4+3450x_5^4m_1m_4-2663x_1^3m_1^2m_4$
$-6694x_1^2x_2m_1^2m_4-6694x_1x_2^2m_1^2m_4$
$-2663x_2^3m_1^2m_4-6694x_1^2x_3m_1^2m_4-12093x_1x_2x_3m_1^2m_4-6694x_2^2x_3m_1^2m_4$
$-6694x_1x_3^2m_1^2m_4-6694x_2x_3^2m_1^2m_4-2663x_3^3m_1^2m_4-6694x_1^2x_4m_1^2m_4$
$-12093x_1x_2x_4m_1^2m_4-6694x_2^2x_4m_1^2m_4-12093x_1x_3x_4m_1^2m_4-12093x_2x_3x_4m_1^2m_4$
$-6694x_3^2x_4m_1^2m_4-6694x_1x_4^2m_1^2m_4-6694x_2x_4^2m_1^2m_4-6694x_3x_4^2m_1^2m_4$
$-2663x_4^3m_1^2m_4-6694x_1^2x_5m_1^2m_4-12093x_1x_2x_5m_1^2m_4$
$-6694x_2^2x_5m_1^2m_4-12093x_1x_3x_5m_1^2m_4-12093x_2x_3x_5m_1^2m_4-6694x_3^2x_5m_1^2m_4$
$-12093x_1x_4x_5m_1^2m_4-12093x_2x_4x_5m_1^2m_4-12093x_3x_4x_5m_1^2m_4-6694x_4^2x_5m_1^2m_4$
$-6694x_1x_5^2m_1^2m_4-6694x_2x_5^2m_1^2m_4-6694x_3x_5^2m_1^2m_4-6694x_4x_5^2m_1^2m_4$
$-2663x_5^3m_1^2m_4+798x_1^2m_1^3m_4+1458x_1x_2m_1^3m_4+798x_2^2m_1^3m_4+1458x_1x_3m_1^3m_4$
$+1458x_2x_3m_1^3m_4+798x_3^2m_1^3m_4+1458x_1x_4m_1^3m_4+1458x_2x_4m_1^3m_4+1458x_3x_4m_1^3m_4$
$+798x_4^2m_1^3m_4+1458x_1x_5m_1^3m_4+1458x_2x_5m_1^3m_4+1458x_3x_5m_1^3m_4+1458x_4x_5m_1^3m_4$
$+798x_5^2m_1^3m_4-72x_1m_1^4m_4-72x_2m_1^4m_4-72x_3m_1^4m_4-72x_4m_1^4m_4-72x_5m_1^4m_4$
$+3450x_1^4m_2m_4+10664x_1^3x_2m_2m_4+14674x_1^2x_2^2m_2m_4+10664x_1x_2^3m_2m_4+3450x_2^4m_2m_4$
$+10664x_1^3x_3m_2m_4+26298x_1^2x_2x_3m_2m_4+26298x_1x_2^2x_3m_2m_4+10664x_2^3x_3m_2m_4$
$+14674x_1^2x_3^2m_2m_4+26298x_1x_2x_3^2m_2m_4+14674x_2^2x_3^2m_2m_4$
$+10664x_1x_3^3m_2m_4+10664x_2x_3^3m_2m_4$
$+3450x_3^4m_2m_4+10664x_1^3x_4m_2m_4+26298x_1^2x_2x_4m_2m_4+26298x_1x_2^2x_4m_2m_4$
$+10664x_2^3x_4m_2m_4+26298x_1^2x_3x_4m_2m_4+47004x_1x_2x_3x_4m_2m_4$
$+26298x_2^2x_3x_4m_2m_4+26298x_1x_3^2x_4m_2m_4+26298x_2x_3^2x_4m_2m_4$
$+10664x_3^3x_4m_2m_4+14674x_1^2x_4^2m_2m_4$
$+26298x_1x_2x_4^2m_2m_4+14674x_2^2x_4^2m_2m_4+26298x_1x_3x_4^2m_2m_4+26298x_2x_3x_4^2m_2m_4$
$+14674x_3^2x_4^2m_2m_4+10664x_1x_4^3m_2m_4+10664x_2x_4^3m_2m_4+10664x_3x_4^3m_2m_4$

$+3450x_4^4m_2m_4+10664x_1^3x_5m_2m_4+26298x_1^2x_2x_5m_2m_4+26298x_1x_2^2x_5m_2m_4$
$+10664x_2^3x_5m_2m_4+26298x_1^2x_3x_5m_2m_4+47004x_1x_2x_3x_5m_2m_4+26298x_2^2x_3x_5m_2m_4$
$+26298x_1x_3^2x_5m_2m_4+26298x_2x_3^2x_5m_2m_4+10664x_3^3x_5m_2m_4$
$+26298x_1^2x_4x_5m_2m_4+47004x_1x_2x_4x_5m_2m_4$
$+26298x_2^2x_4x_5m_2m_4+47004x_1x_3x_4x_5m_2m_4+47004x_2x_3x_4x_5m_2m_4+26298x_3^2x_4x_5m_2m_4$
$+26298x_1x_4^2x_5m_2m_4+26298x_2x_4^2x_5m_2m_4+26298x_3x_4^2x_5m_2m_4+10664x_4^3x_5m_2m_4$
$+14674x_1^2x_5^2m_2m_4+26298x_1x_2x_5^2m_2m_4$
$+14674x_2^2x_5^2m_2m_4+26298x_1x_3x_5^2m_2m_4+26298x_2x_3x_5^2m_2m_4+14674x_3^2x_5^2m_2m_4$
$+26298x_1x_4x_5^2m_2m_4+26298x_2x_4x_5^2m_2m_4+26298x_3x_4x_5^2m_2m_4+14674x_4^2x_5^2m_2m_4$
$+10664x_1x_5^3m_2m_4+10664x_2x_5^3m_2m_4+10664x_3x_5^3m_2m_4+10664x_4x_5^3m_2m_4+3450x_5^4m_2m_4$
$-6912x_1^3m_1m_2m_4-17390x_1^2x_2m_1m_2m_4-17390x_1x_2^2m_1m_2m_4-6912x_2^3m_1m_2m_4$
$-17390x_1^2x_3m_1m_2m_4-31434x_1x_2x_3m_1m_2m_4-17390x_2^2x_3m_1m_2m_4-17390x_1x_3^2m_1m_2m_4$
$-17390x_2x_3^2m_1m_2m_4-6912x_3^3m_1m_2m_4-17390x_1^2x_4m_1m_2m_4-31434x_1x_2x_4m_1m_2m_4$
$-17390x_2^2x_4m_1m_2m_4-31434x_1x_3x_4m_1m_2m_4-31434x_2x_3x_4m_1m_2m_4-17390x_3^2x_4m_1m_2m_4$
$-17390x_1x_4^2m_1m_2m_4-17390x_2x_4^2m_1m_2m_4-17390x_3x_4^2m_1m_2m_4-6912x_4^3m_1m_2m_4$
$-17390x_1^2x_5m_1m_2m_4-31434x_1x_2x_5m_1m_2m_4-17390x_2^2x_5m_1m_2m_4$
$-31434x_1x_3x_5m_1m_2m_4-31434x_2x_3x_5m_1m_2m_4$
$-17390x_3^2x_5m_1m_2m_4-31434x_1x_4x_5m_1m_2m_4$
$-31434x_2x_4x_5m_1m_2m_4-31434x_3x_4x_5m_1m_2m_4-17390x_4^2x_5m_1m_2m_4-17390x_1x_5^2m_1m_2m_4$
$-17390x_2x_5^2m_1m_2m_4-17390x_3x_5^2m_1m_2m_4-17390x_4x_5^2m_1m_2m_4-6912x_5^3m_1m_2m_4$
$+4452x_1^2m_1^2m_2m_4+8122x_1x_2m_1^2m_2m_4+4452x_2^2m_1^2m_2m_4+8122x_1x_3m_1^2m_2m_4$
$+8122x_2x_3m_1^2m_2m_4+4452x_3^2m_1^2m_2m_4+8122x_1x_4m_1^2m_2m_4+8122x_2x_4m_1^2m_2m_4$
$+8122x_3x_4m_1^2m_2m_4+4452x_4^2m_1^2m_2m_4+8122x_1x_5m_1^2m_2m_4+8122x_2x_5m_1^2m_2m_4$
$+8122x_3x_5m_1^2m_2m_4+8122x_4x_5m_1^2m_2m_4+4452x_5^2m_1^2m_2m_4-1002x_1m_1^3m_2m_4$
$-1002x_2m_1^3m_2m_4-1002x_3m_1^3m_2m_4-1002x_4m_1^3m_2m_4-1002x_5m_1^3m_2m_4+51m_1^4m_2m_4$
$-2663x_1^3m_2^2m_4-6694x_1^2x_2m_2^2m_4-6694x_1x_2^2m_2^2m_4-2663x_2^3m_2^2m_4$
$-6694x_1^2x_3m_2^2m_4-12093x_1x_2x_3m_2^2m_4-6694x_2^2x_3m_2^2m_4-6694x_1x_3^2m_2^2m_4$
$-6694x_2x_3^2m_2^2m_4-2663x_3^3m_2^2m_4-6694x_1^2x_4m_2^2m_4-12093x_1x_2x_4m_2^2m_4$
$-6694x_2^2x_4m_2^2m_4-12093x_1x_3x_4m_2^2m_4-12093x_2x_3x_4m_2^2m_4$
$-6694x_3^2x_4m_2^2m_4-6694x_1x_4^2m_2^2m_4-6694x_2x_4^2m_2^2m_4-6694x_3x_4^2m_2^2m_4$
$-2663x_4^3m_2^2m_4-6694x_1^2x_5m_2^2m_4-12093x_1x_2x_5m_2^2m_4$
$-6694x_2^2x_5m_2^2m_4-12093x_1x_3x_5m_2^2m_4-12093x_2x_3x_5m_2^2m_4-6694x_3^2x_5m_2^2m_4$
$-12093x_1x_4x_5m_2^2m_4-12093x_2x_4x_5m_2^2m_4-12093x_3x_4x_5m_2^2m_4-6694x_4^2x_5m_2^2m_4$
$-6694x_1x_5^2m_2^2m_4-6694x_2x_5^2m_2^2m_4-6694x_3x_5^2m_2^2m_4-6694x_4x_5^2m_2^2m_4$
$-2663x_5^3m_2^2m_4+4452x_1^2m_1m_2^2m_4+8122x_1x_2m_1m_2^2m_4+4452x_2^2m_1m_2^2m_4$
$+8122x_1x_3m_1m_2^2m_4+8122x_2x_3m_1m_2^2m_4+4452x_3^2m_1m_2^2m_4+8122x_1x_4m_1m_2^2m_4$
$+8122x_2x_4m_1m_2^2m_4+8122x_3x_4m_1m_2^2m_4+4452x_4^2m_1m_2^2m_4+8122x_1x_5m_1m_2^2m_4$
$+8122x_2x_5m_1m_2^2m_4+8122x_3x_5m_1m_2^2m_4+8122x_4x_5m_1m_2^2m_4$
$+4452x_5^2m_1m_2^2m_4-2158x_1m_1^2m_2^2m_4-2158x_2m_1^2m_2^2m_4-2158x_3m_1^2m_2^2m_4$
$-2158x_4m_1^2m_2^2m_4-2158x_5m_1^2m_2^2m_4+279m_1^3m_2^2m_4+798x_1^2m_2^3m_4$
$+1458x_1x_2m_2^3m_4+798x_2^2m_2^3m_4+1458x_1x_3m_2^3m_4+1458x_2x_3m_2^3m_4$

$+798x_3^2m_2^3m_4+1458x_1x_4m_2^3m_4+1458x_2x_4m_2^3m_4+1458x_3x_4m_2^3m_4+798x_4^2m_2^3m_4$
$+1458x_1x_5m_2^3m_4+1458x_2x_5m_2^3m_4+1458x_3x_5m_2^3m_4+1458x_4x_5m_2^3m_4+798x_5^2m_2^3m_4$
$-1002x_1m_1m_2^3m_4-1002x_2m_1m_2^3m_4-1002x_3m_1m_2^3m_4-1002x_4m_1m_2^3m_4$
$-1002x_5m_1m_2^3m_4+279m_1^2m_2^3m_4-72x_1m_2^4m_4-72x_2m_2^4m_4-72x_3m_2^4m_4-72x_4m_2^4m_4$
$-72x_5m_2^4m_4+51m_1m_2^4m_4+3450x_1^4m_3m_4+10664x_1^3x_2m_3m_4+14674x_1^2x_2^2m_3m_4$
$+10664x_1x_2^3m_3m_4+3450x_2^4m_3m_4+10664x_1^3x_3m_3m_4+26298x_1^2x_2x_3m_3m_4$
$+26298x_1x_2^2x_3m_3m_4+10664x_2^3x_3m_3m_4+14674x_1^2x_3^2m_3m_4$
$+26298x_1x_2x_3^2m_3m_4+14674x_2^2x_3^2m_3m_4$
$+10664x_1x_3^3m_3m_4+10664x_2x_3^3m_3m_4+3450x_3^4m_3m_4+10664x_1^3x_4m_3m_4$
$+26298x_1^2x_2x_4m_3m_4+26298x_1x_2^2x_4m_3m_4+10664x_2^3x_4m_3m_4+26298x_1^2x_3x_4m_3m_4$
$+47004x_1x_2x_3x_4m_3m_4+26298x_2^2x_3x_4m_3m_4+26298x_1x_3^2x_4m_3m_4+26298x_2x_3^2x_4m_3m_4$
$+10664x_3^3x_4m_3m_4+14674x_1^2x_4^2m_3m_4+26298x_1x_2x_4^2m_3m_4+14674x_2^2x_4^2m_3m_4$
$+26298x_1x_3x_4^2m_3m_4+26298x_2x_3x_4^2m_3m_4+14674x_3^2x_4^2m_3m_4+10664x_1x_4^3m_3m_4$
$+10664x_2x_4^3m_3m_4+10664x_3x_4^3m_3m_4+3450x_4^4m_3m_4$
$+10664x_1^3x_5m_3m_4+26298x_1^2x_2x_5m_3m_4$
$+26298x_1x_2^2x_5m_3m_4+10664x_2^3x_5m_3m_4+26298x_1^2x_3x_5m_3m_4+47004x_1x_2x_3x_5m_3m_4$
$+26298x_2^2x_3x_5m_3m_4+26298x_1x_3^2x_5m_3m_4+26298x_2x_3^2x_5m_3m_4+10664x_3^3x_5m_3m_4$
$+26298x_1^2x_4x_5m_3m_4+47004x_1x_2x_4x_5m_3m_4+26298x_2^2x_4x_5m_3m_4+47004x_1x_3x_4x_5m_3m_4$
$+47004x_2x_3x_4x_5m_3m_4+26298x_3^2x_4x_5m_3m_4+26298x_1x_4^2x_5m_3m_4+26298x_2x_4^2x_5m_3m_4$
$+26298x_3x_4^2x_5m_3m_4+10664x_4^3x_5m_3m_4+14674x_1^2x_5^2m_3m_4+26298x_1x_2x_5^2m_3m_4$
$+14674x_2^2x_5^2m_3m_4+26298x_1x_3x_5^2m_3m_4+26298x_2x_3x_5^2m_3m_4$
$+14674x_3^2x_5^2m_3m_4+26298x_1x_4x_5^2m_3m_4$
$+26298x_2x_4x_5^2m_3m_4+26298x_3x_4x_5^2m_3m_4+14674x_4^2x_5^2m_3m_4+10664x_1x_5^3m_3m_4$
$+10664x_2x_5^3m_3m_4+10664x_3x_5^3m_3m_4+10664x_4x_5^3m_3m_4+3450x_5^4m_3m_4-6912x_1^3m_1m_3m_4$
$-17390x_1^2x_2m_1m_3m_4-17390x_1x_2^2m_1m_3m_4-6912x_2^3m_1m_3m_4-17390x_1^2x_3m_1m_3m_4$
$-31434x_1x_2x_3m_1m_3m_4-17390x_2^2x_3m_1m_3m_4-17390x_1x_3^2m_1m_3m_4-17390x_2x_3^2m_1m_3m_4$
$-6912x_3^3m_1m_3m_4-17390x_1^2x_4m_1m_3m_4-31434x_1x_2x_4m_1m_3m_4-17390x_2^2x_4m_1m_3m_4$
$-31434x_1x_3x_4m_1m_3m_4-31434x_2x_3x_4m_1m_3m_4-17390x_3^2x_4m_1m_3m_4-17390x_1x_4^2m_1m_3m_4$
$-17390x_2x_4^2m_1m_3m_4-17390x_3x_4^2m_1m_3m_4-6912x_4^3m_1m_3m_4-17390x_1^2x_5m_1m_3m_4$
$-31434x_1x_2x_5m_1m_3m_4-17390x_2^2x_5m_1m_3m_4$
$-31434x_1x_3x_5m_1m_3m_4-31434x_2x_3x_5m_1m_3m_4$
$-17390x_3^2x_5m_1m_3m_4-31434x_1x_4x_5m_1m_3m_4$
$-31434x_2x_4x_5m_1m_3m_4-31434x_3x_4x_5m_1m_3m_4-17390x_4^2x_5m_1m_3m_4-17390x_1x_5^2m_1m_3m_4$
$-17390x_2x_5^2m_1m_3m_4-17390x_3x_5^2m_1m_3m_4-17390x_4x_5^2m_1m_3m_4-6912x_5^3m_1m_3m_4$
$+4452x_1^2m_1^2m_3m_4+8122x_1x_2m_1^2m_3m_4+4452x_2^2m_1^2m_3m_4+8122x_1x_3m_1^2m_3m_4$
$+8122x_2x_3m_1^2m_3m_4+4452x_3^2m_1^2m_3m_4+8122x_1x_4m_1^2m_3m_4+8122x_2x_4m_1^2m_3m_4$
$+8122x_3x_4m_1^2m_3m_4+4452x_4^2m_1^2m_3m_4+8122x_1x_5m_1^2m_3m_4+8122x_2x_5m_1^2m_3m_4$
$+8122x_3x_5m_1^2m_3m_4+8122x_4x_5m_1^2m_3m_4+4452x_5^2m_1^2m_3m_4-1002x_1m_1^3m_3m_4$
$-1002x_2m_1^3m_3m_4-1002x_3m_1^3m_3m_4-1002x_4m_1^3m_3m_4-1002x_5m_1^3m_3m_4+51m_1^4m_3m_4$
$-6912x_1^3m_2m_3m_4-17390x_1^2x_2m_2m_3m_4-17390x_1x_2^2m_2m_3m_4$
$-6912x_2^3m_2m_3m_4-17390x_1^2x_3m_2m_3m_4-31434x_1x_2x_3m_2m_3m_4-17390x_2^2x_3m_2m_3m_4$

$-17390x_1x_3^2m_2m_3m_4-17390x_2x_3^2m_2m_3m_4-6912x_3^3m_2m_3m_4-17390x_1^2x_4m_2m_3m_4$
$-31434x_1x_2x_4m_2m_3m_4-17390x_2^2x_4m_2m_3m_4-31434x_1x_3x_4m_2m_3m_4$
$-31434x_2x_3x_4m_2m_3m_4-17390x_3^2x_4m_2m_3m_4-17390x_1x_4^2m_2m_3m_4$
$-17390x_2x_4^2m_2m_3m_4-17390x_3x_4^2m_2m_3m_4-6912x_4^3m_2m_3m_4$
$-17390x_1^2x_5m_2m_3m_4-31434x_1x_2x_5m_2m_3m_4-17390x_2^2x_5m_2m_3m_4$
$-31434x_1x_3x_5m_2m_3m_4-31434x_2x_3x_5m_2m_3m_4-17390x_3^2x_5m_2m_3m_4$
$-31434x_1x_4x_5m_2m_3m_4-31434x_2x_4x_5m_2m_3m_4-31434x_3x_4x_5m_2m_3m_4$
$-17390x_4^2x_5m_2m_3m_4-17390x_1x_5^2m_2m_3m_4-17390x_2x_5^2m_2m_3m_4$
$-17390x_3x_5^2m_2m_3m_4-17390x_4x_5^2m_2m_3m_4-6912x_5^3m_2m_3m_4+11336x_1^2m_1m_2m_3m_4$
$+20672x_1x_2m_1m_2m_3m_4+11336x_2^2m_1m_2m_3m_4$
$+20672x_1x_3m_1m_2m_3m_4+20672x_2x_3m_1m_2m_3m_4$
$+11336x_3^2m_1m_2m_3m_4+20672x_1x_4m_1m_2m_3m_4$
$+20672x_2x_4m_1m_2m_3m_4+20672x_3x_4m_1m_2m_3m_4+11336x_4^2m_1m_2m_3m_4$
$+20672x_1x_5m_1m_2m_3m_4+20672x_2x_5m_1m_2m_3m_4+20672x_3x_5m_1m_2m_3m_4$
$+20672x_4x_5m_1m_2m_3m_4+11336x_5^2m_1m_2m_3m_4$
$-5394x_1m_1^2m_2m_3m_4-5394x_2m_1^2m_2m_3m_4$
$-5394x_3m_1^2m_2m_3m_4-5394x_4m_1^2m_2m_3m_4-5394x_5m_1^2m_2m_3m_4+684m_1^3m_2m_3m_4$
$+4452x_1^2m_2^2m_3m_4+8122x_1x_2m_2^2m_3m_4+4452x_2^2m_2^2m_3m_4$
$+8122x_1x_3m_2^2m_3m_4+8122x_2x_3m_2^2m_3m_4$
$+4452x_3^2m_2^2m_3m_4+8122x_1x_4m_2^2m_3m_4+8122x_2x_4m_2^2m_3m_4+8122x_3x_4m_2^2m_3m_4$
$+4452x_4^2m_2^2m_3m_4+8122x_1x_5m_2^2m_3m_4+8122x_2x_5m_2^2m_3m_4+8122x_3x_5m_2^2m_3m_4$
$+8122x_4x_5m_2^2m_3m_4+4452x_5^2m_2^2m_3m_4-5394x_1m_1m_2^2m_3m_4-5394x_2m_1m_2^2m_3m_4$
$-5394x_3m_1m_2^2m_3m_4-5394x_4m_1m_2^2m_3m_4-5394x_5m_1m_2^2m_3m_4+1456m_1^2m_2^2m_3m_4$
$-1002x_1m_2^3m_3m_4-1002x_2m_2^3m_3m_4-1002x_3m_2^3m_3m_4-1002x_4m_2^3m_3m_4$
$-1002x_5m_2^3m_3m_4+684m_1m_2^3m_3m_4+51m_2^4m_3m_4-2663x_1^3m_3^2m_4-6694x_1^2x_2m_3^2m_4$
$-6694x_1x_2^2m_3^2m_4-2663x_2^3m_3^2m_4-6694x_1^2x_3m_3^2m_4-12093x_1x_2x_3m_3^2m_4$
$-6694x_2^2x_3m_3^2m_4-6694x_1x_3^2m_3^2m_4-6694x_2x_3^2m_3^2m_4-2663x_3^3m_3^2m_4$
$-6694x_1^2x_4m_3^2m_4-12093x_1x_2x_4m_3^2m_4$
$-6694x_2^2x_4m_3^2m_4-12093x_1x_3x_4m_3^2m_4-12093x_2x_3x_4m_3^2m_4-6694x_3^2x_4m_3^2m_4$
$-6694x_1x_4^2m_3^2m_4-6694x_2x_4^2m_3^2m_4-6694x_3x_4^2m_3^2m_4-2663x_4^3m_3^2m_4$
$-6694x_1^2x_5m_3^2m_4-12093x_1x_2x_5m_3^2m_4-6694x_2^2x_5m_3^2m_4-12093x_1x_3x_5m_3^2m_4$
$-12093x_2x_3x_5m_3^2m_4-6694x_3^2x_5m_3^2m_4-12093x_1x_4x_5m_3^2m_4-12093x_2x_4x_5m_3^2m_4$
$-12093x_3x_4x_5m_3^2m_4-6694x_4^2x_5m_3^2m_4-6694x_1x_5^2m_3^2m_4-6694x_2x_5^2m_3^2m_4$
$-6694x_3x_5^2m_3^2m_4-6694x_4x_5^2m_3^2m_4-2663x_5^3m_3^2m_4+4452x_1^2m_1m_3^2m_4$
$+8122x_1x_2m_1m_3^2m_4+4452x_2^2m_1m_3^2m_4$
$+8122x_1x_3m_1m_3^2m_4+8122x_2x_3m_1m_3^2m_4+4452x_3^2m_1m_3^2m_4+8122x_1x_4m_1m_3^2m_4$
$+8122x_2x_4m_1m_3^2m_4+8122x_3x_4m_1m_3^2m_4+4452x_4^2m_1m_3^2m_4+8122x_1x_5m_1m_3^2m_4$
$+8122x_2x_5m_1m_3^2m_4+8122x_3x_5m_1m_3^2m_4+8122x_4x_5m_1m_3^2m_4$
$+4452x_5^2m_1m_3^2m_4-2158x_1m_1^2m_3^2m_4-2158x_2m_1^2m_3^2m_4-2158x_3m_1^2m_3^2m_4$
$-2158x_4m_1^2m_3^2m_4-2158x_5m_1^2m_3^2m_4+279m_1^3m_3^2m_4+4452x_1^2m_2m_3^2m_4$
$+8122x_1x_2m_2m_3^2m_4+4452x_2^2m_2m_3^2m_4+8122x_1x_3m_2m_3^2m_4$

$+8122x_2x_3m_2m_3^2m_4+4452x_3^2m_2m_3^2m_4$
$+8122x_1x_4m_2m_3^2m_4+8122x_2x_4m_2m_3^2m_4+8122x_3x_4m_2m_3^2m_4+4452x_4^2m_2m_3^2m_4$
$+8122x_1x_5m_2m_3^2m_4+8122x_2x_5m_2m_3^2m_4+8122x_3x_5m_2m_3^2m_4+8122x_4x_5m_2m_3^2m_4$
$+4452x_5^2m_2m_3^2m_4-5394x_1m_1m_2m_3^2m_4-5394x_2m_1m_2m_3^2m_4-5394x_3m_1m_2m_3^2m_4$
$-5394x_4m_1m_2m_3^2m_4-5394x_5m_1m_2m_3^2m_4+1456m_1^2m_2m_3^2m_4$
$-2158x_1m_2^2m_3^2m_4-2158x_2m_2^2m_3^2m_4$
$-2158x_3m_2^2m_3^2m_4-2158x_4m_2^2m_3^2m_4-2158x_5m_2^2m_3^2m_4+1456m_1m_2^2m_3^2m_4$
$+279m_2^3m_3^2m_4+798x_1^2m_3^3m_4+1458x_1x_2m_3^3m_4+798x_2^2m_3^3m_4+1458x_1x_3m_3^3m_4$
$+1458x_2x_3m_3^3m_4+798x_3^2m_3^3m_4+1458x_1x_4m_3^3m_4+1458x_2x_4m_3^3m_4+1458x_3x_4m_3^3m_4$
$+798x_4^2m_3^3m_4+1458x_1x_5m_3^3m_4+1458x_2x_5m_3^3m_4+1458x_3x_5m_3^3m_4+1458x_4x_5m_3^3m_4$
$+798x_5^2m_3^3m_4-1002x_1m_1m_3^3m_4-1002x_2m_1m_3^3m_4-1002x_3m_1m_3^3m_4-1002x_4m_1m_3^3m_4$
$-1002x_5m_1m_3^3m_4+279m_1^2m_3^3m_4-1002x_1m_2m_3^3m_4-1002x_2m_2m_3^3m_4-1002x_3m_2m_3^3m_4$
$-1002x_4m_2m_3^3m_4-1002x_5m_2m_3^3m_4$
$+684m_1m_2m_3^3m_4+279m_2^2m_3^3m_4-72x_1m_3^4m_4-72x_2m_3^4m_4-72x_3m_3^4m_4-72x_4m_3^4m_4$
$-72x_5m_3^4m_4+51m_1m_3^4m_4+51m_2m_3^4m_4+1305x_1^4m_4^2+4020x_1^3x_2m_4^2$
$+5523x_1^2x_2^2m_4^2+4020x_1x_2^3m_4^2+1305x_2^4m_4^2+4020x_1^3x_3m_4^2+9883x_1^2x_2x_3m_4^2$
$+9883x_1x_2^2x_3m_4^2+4020x_2^3x_3m_4^2+5523x_1^2x_3^2m_4^2+9883x_1x_2x_3^2m_4^2+5523x_2^2x_3^2m_4^2$
$+4020x_1x_3^3m_4^2+4020x_2x_3^3m_4^2+1305x_3^4m_4^2+4020x_1^3x_4m_4^2+9883x_1^2x_2x_4m_4^2$
$+9883x_1x_2^2x_4m_4^2+4020x_2^3x_4m_4^2+9883x_1^2x_3x_4m_4^2+17634x_1x_2x_3x_4m_4^2$
$+9883x_2^2x_3x_4m_4^2+9883x_1x_3^2x_4m_4^2+9883x_2x_3^2x_4m_4^2+4020x_3^3x_4m_4^2$
$+5523x_1^2x_4^2m_4^2+9883x_1x_2x_4^2m_4^2+5523x_2^2x_4^2m_4^2+9883x_1x_3x_4^2m_4^2$
$+9883x_2x_3x_4^2m_4^2+5523x_3^2x_4^2m_4^2+4020x_1x_4^3m_4^2+4020x_2x_4^3m_4^2+4020x_3x_4^3m_4^2$
$+1305x_4^4m_4^2+4020x_1^3x_5m_4^2+9883x_1^2x_2x_5m_4^2+9883x_1x_2^2x_5m_4^2+4020x_2^3x_5m_4^2$
$+9883x_1^2x_3x_5m_4^2+17634x_1x_2x_3x_5m_4^2+9883x_2^2x_3x_5m_4^2+9883x_1x_3^2x_5m_4^2$
$+9883x_2x_3^2x_5m_4^2+4020x_3^3x_5m_4^2+9883x_1^2x_4x_5m_4^2+17634x_1x_2x_4x_5m_4^2$
$+9883x_2^2x_4x_5m_4^2+17634x_1x_3x_4x_5m_4^2+17634x_2x_3x_4x_5m_4^2+9883x_3^2x_4x_5m_4^2$
$+9883x_1x_4^2x_5m_4^2+9883x_2x_4^2x_5m_4^2+9883x_3x_4^2x_5m_4^2$
$+4020x_4^3x_5m_4^2+5523x_1^2x_5^2m_4^2+9883x_1x_2x_5^2m_4^2+5523x_2^2x_5^2m_4^2$
$+9883x_1x_3x_5^2m_4^2+9883x_2x_3x_5^2m_4^2+5523x_3^2x_5^2m_4^2+9883x_1x_4x_5^2m_4^2$
$+9883x_2x_4x_5^2m_4^2+9883x_3x_4x_5^2m_4^2+5523x_4^2x_5^2m_4^2$
$+4020x_1x_5^3m_4^2+4020x_2x_5^3m_4^2$
$+4020x_3x_5^3m_4^2+4020x_4x_5^3m_4^2+1305x_5^4m_4^2-2663x_1^3m_1m_4^2-6694x_1^2x_2m_1m_4^2$
$-6694x_1x_2^2m_1m_4^2-2663x_2^3m_1m_4^2-6694x_1^2x_3m_1m_4^2-12093x_1x_2x_3m_1m_4^2$
$-6694x_2^2x_3m_1m_4^2-6694x_1x_3^2m_1m_4^2-6694x_2x_3^2m_1m_4^2-2663x_3^3m_1m_4^2$
$-6694x_1^2x_4m_1m_4^2-12093x_1x_2x_4m_1m_4^2-6694x_2^2x_4m_1m_4^2-12093x_1x_3x_4m_1m_4^2$
$-12093x_2x_3x_4m_1m_4^2-6694x_3^2x_4m_1m_4^2$
$-6694x_1x_4^2m_1m_4^2-6694x_2x_4^2m_1m_4^2-6694x_3x_4^2m_1m_4^2$
$-2663x_4^3m_1m_4^2-6694x_1^2x_5m_1m_4^2-12093x_1x_2x_5m_1m_4^2$
$-6694x_2^2x_5m_1m_4^2-12093x_1x_3x_5m_1m_4^2-12093x_2x_3x_5m_1m_4^2$
$-6694x_3^2x_5m_1m_4^2-12093x_1x_4x_5m_1m_4^2-12093x_2x_4x_5m_1m_4^2-12093x_3x_4x_5m_1m_4^2$
$-6694x_4^2x_5m_1m_4^2-6694x_1x_5^2m_1m_4^2-6694x_2x_5^2m_1m_4^2-6694x_3x_5^2m_1m_4^2$

$-6694x_4x_5^2m_1m_4^2-2663x_5^3m_1m_4^2+1748x_1^2m_1^2m_4^2+3190x_1x_2m_1^2m_4^2$
$+1748x_2^2m_1^2m_4^2+3190x_1x_3m_1^2m_4^2+3190x_2x_3m_1^2m_4^2+1748x_3^2m_1^2m_4^2$
$+3190x_1x_4m_1^2m_4^2+3190x_2x_4m_1^2m_4^2+3190x_3x_4m_1^2m_4^2+1748x_4^2m_1^2m_4^2$
$+3190x_1x_5m_1^2m_4^2+3190x_2x_5m_1^2m_4^2+3190x_3x_5m_1^2m_4^2+3190x_4x_5m_1^2m_4^2$
$+1748x_5^2m_1^2m_4^2-402x_1m_1^3m_4^2-402x_2m_1^3m_4^2-402x_3m_1^3m_4^2-402x_4m_1^3m_4^2$
$-402x_5m_1^3m_4^2+21m_1^4m_4^2-2663x_1^3m_2m_4^2-6694x_1^2x_2m_2m_4^2-6694x_1x_2^2m_2m_4^2$
$-2663x_2^3m_2m_4^2-6694x_1^2x_3m_2m_4^2-12093x_1x_2x_3m_2m_4^2-6694x_2^2x_3m_2m_4^2$
$-6694x_1x_3^2m_2m_4^2-6694x_2x_3^2m_2m_4^2-2663x_3^3m_2m_4^2-6694x_1^2x_4m_2m_4^2$
$-12093x_1x_2x_4m_2m_4^2-6694x_2^2x_4m_2m_4^2-12093x_1x_3x_4m_2m_4^2-12093x_2x_3x_4m_2m_4^2$
$-6694x_3^2x_4m_2m_4^2-6694x_1x_4^2m_2m_4^2-6694x_2x_4^2m_2m_4^2-6694x_3x_4^2m_2m_4^2$
$-2663x_4^3m_2m_4^2-6694x_1^2x_5m_2m_4^2-12093x_1x_2x_5m_2m_4^2-6694x_2^2x_5m_2m_4^2$
$-12093x_1x_3x_5m_2m_4^2-12093x_2x_3x_5m_2m_4^2-6694x_3^2x_5m_2m_4^2-12093x_1x_4x_5m_2m_4^2$
$-12093x_2x_4x_5m_2m_4^2-12093x_3x_4x_5m_2m_4^2-6694x_4^2x_5m_2m_4^2-6694x_1x_5^2m_2m_4^2$
$-6694x_2x_5^2m_2m_4^2-6694x_3x_5^2m_2m_4^2-6694x_4x_5^2m_2m_4^2-2663x_5^3m_2m_4^2$
$+4452x_1^2m_1m_2m_4^2+8122x_1x_2m_1m_2m_4^2+4452x_2^2m_1m_2m_4^2+8122x_1x_3m_1m_2m_4^2$
$+8122x_2x_3m_1m_2m_4^2+4452x_3^2m_1m_2m_4^2+8122x_1x_4m_1m_2m_4^2+8122x_2x_4m_1m_2m_4^2$
$+8122x_3x_4m_1m_2m_4^2+4452x_4^2m_1m_2m_4^2+8122x_1x_5m_1m_2m_4^2+8122x_2x_5m_1m_2m_4^2$
$+8122x_3x_5m_1m_2m_4^2+8122x_4x_5m_1m_2m_4^2+4452x_5^2m_1m_2m_4^2-2158x_1m_1^2m_2m_4^2$
$-2158x_2m_1^2m_2m_4^2-2158x_3m_1^2m_2m_4^2-2158x_4m_1^2m_2m_4^2-2158x_5m_1^2m_2m_4^2$
$+279m_1^3m_2m_4^2+1748x_1^2m_2^2m_4^2+3190x_1x_2m_2^2m_4^2+1748x_2^2m_2^2m_4^2$
$+3190x_1x_3m_2^2m_4^2+3190x_2x_3m_2^2m_4^2+1748x_3^2m_2^2m_4^2+3190x_1x_4m_2^2m_4^2$
$+3190x_2x_4m_2^2m_4^2+3190x_3x_4m_2^2m_4^2+1748x_4^2m_2^2m_4^2+3190x_1x_5m_2^2m_4^2$
$+3190x_2x_5m_2^2m_4^2+3190x_3x_5m_2^2m_4^2+3190x_4x_5m_2^2m_4^2+1748x_5^2m_2^2m_4^2$
$-2158x_1m_1m_2^2m_4^2-2158x_2m_1m_2^2m_4^2-2158x_3m_1m_2^2m_4^2-2158x_4m_1m_2^2m_4^2$
$-2158x_5m_1m_2^2m_4^2+593m_1^2m_2^2m_4^2-402x_1m_2^3m_4^2-402x_2m_2^3m_4^2-402x_3m_2^3m_4^2$
$-402x_4m_2^3m_4^2-402x_5m_2^3m_4^2+279m_1m_2^3m_4^2+21m_2^4m_4^2-2663x_1^3m_3m_4^2$
$-6694x_1^2x_2m_3m_4^2-6694x_1x_2^2m_3m_4^2-2663x_2^3m_3m_4^2-6694x_1^2x_3m_3m_4^2$
$-12093x_1x_2x_3m_3m_4^2-6694x_2^2x_3m_3m_4^2-6694x_1x_3^2m_3m_4^2-6694x_2x_3^2m_3m_4^2$
$-2663x_3^3m_3m_4^2-6694x_1^2x_4m_3m_4^2-12093x_1x_2x_4m_3m_4^2-6694x_2^2x_4m_3m_4^2$
$-12093x_1x_3x_4m_3m_4^2-12093x_2x_3x_4m_3m_4^2-6694x_3^2x_4m_3m_4^2-6694x_1x_4^2m_3m_4^2$
$-6694x_2x_4^2m_3m_4^2-6694x_3x_4^2m_3m_4^2-2663x_4^3m_3m_4^2-6694x_1^2x_5m_3m_4^2$
$-12093x_1x_2x_5m_3m_4^2-6694x_2^2x_5m_3m_4^2$
$-12093x_1x_3x_5m_3m_4^2-12093x_2x_3x_5m_3m_4^2-6694x_3^2x_5m_3m_4^2$
$-12093x_1x_4x_5m_3m_4^2-12093x_2x_4x_5m_3m_4^2$
$-12093x_3x_4x_5m_3m_4^2-6694x_4^2x_5m_3m_4^2-6694x_1x_5^2m_3m_4^2-6694x_2x_5^2m_3m_4^2-6694x_3x_5^2m_3m_4^2$
$-6694x_4x_5^2m_3m_4^2-2663x_5^3m_3m_4^2+4452x_1^2m_1m_3m_4^2+8122x_1x_2m_1m_3m_4^2+4452x_2^2m_1m_3m_4^2$
$+8122x_1x_3m_1m_3m_4^2+8122x_2x_3m_1m_3m_4^2+4452x_3^2m_1m_3m_4^2$
$+8122x_1x_4m_1m_3m_4^2+8122x_2x_4m_1m_3m_4^2$
$+8122x_3x_4m_1m_3m_4^2+4452x_4^2m_1m_3m_4^2+8122x_1x_5m_1m_3m_4^2$
$+8122x_2x_5m_1m_3m_4^2+8122x_3x_5m_1m_3m_4^2$
$+8122x_4x_5m_1m_3m_4^2+4452x_5^2m_1m_3m_4^2-2158x_1m_1^2m_3m_4^2-2158x_2m_1^2m_3m_4^2-2158x_3m_1^2m_3m_4^2$

$-2158x_4m_1^2m_3m_4^2-2158x_5m_1^2m_3m_4^2+279m_1^3m_3m_4^2+4452x_1^2m_2m_3m_4^2+8122x_1x_2m_2m_3m_4^2$
$+4452x_2^2m_2m_3m_4^2+8122x_1x_3m_2m_3m_4^2+8122x_2x_3m_2m_3m_4^2$
$+4452x_3^2m_2m_3m_4^2+8122x_1x_4m_2m_3m_4^2+8122x_2x_4m_2m_3m_4^2$
$+8122x_3x_4m_2m_3m_4^2+4452x_4^2m_2m_3m_4^2$
$+8122x_1x_5m_2m_3m_4^2+8122x_2x_5m_2m_3m_4^2+8122x_3x_5m_2m_3m_4^2$
$+8122x_4x_5m_2m_3m_4^2+4452x_5^2m_2m_3m_4^2$
$-5394x_1m_1m_2m_3m_4^2-5394x_2m_1m_2m_3m_4^2-5394x_3m_1m_2m_3m_4^2-5394x_4m_1m_2m_3m_4^2$
$-5394x_5m_1m_2m_3m_4^2+1456m_1^2m_2m_3m_4^2-2158x_1m_2^2m_3m_4^2-2158x_2m_2^2m_3m_4^2$
$-2158x_3m_2^2m_3m_4^2-2158x_4m_2^2m_3m_4^2$
$-2158x_5m_2^2m_3m_4^2+1456m_1m_2^2m_3m_4^2+279m_2^3m_3m_4^2+1748x_1^2m_3^2m_4^2+3190x_1x_2m_3^2m_4^2$
$+1748x_2^2m_3^2m_4^2+3190x_1x_3m_3^2m_4^2+3190x_2x_3m_3^2m_4^2+1748x_3^2m_3^2m_4^2+3190x_1x_4m_3^2m_4^2$
$+3190x_2x_4m_3^2m_4^2+3190x_3x_4m_3^2m_4^2+1748x_4^2m_3^2m_4^2+3190x_1x_5m_3^2m_4^2+3190x_2x_5m_3^2m_4^2$
$+3190x_3x_5m_3^2m_4^2+3190x_4x_5m_3^2m_4^2+1748x_5^2m_3^2m_4^2-2158x_1m_1m_3^2m_4^2-2158x_2m_1m_3^2m_4^2$
$-2158x_3m_1m_3^2m_4^2-2158x_4m_1m_3^2m_4^2-2158x_5m_1m_3^2m_4^2+593m_1^2m_3^2m_4^2-2158x_1m_2m_3^2m_4^2$
$-2158x_2m_2m_3^2m_4^2-2158x_3m_2m_3^2m_4^2-2158x_4m_2m_3^2m_4^2-2158x_5m_2m_3^2m_4^2+1456m_1m_2m_3^2m_4^2$
$+593m_2^2m_3^2m_4^2-402x_1m_3^3m_4^2-402x_2m_3^3m_4^2-402x_3m_3^3m_4^2-402x_4m_3^3m_4^2$
$-402x_5m_3^3m_4^2+279m_1m_3^3m_4^2+279m_2m_3^3m_4^2+21m_3^4m_4^2-459x_1^3m_4^3$
$-1152x_1^2x_2m_4^3-1152x_1x_2^2m_4^3-459x_2^3m_4^3-1152x_1^2x_3m_4^3$
$-2079x_1x_2x_3m_4^3-1152x_2^2x_3m_4^3-1152x_1x_3^2m_4^3-1152x_2x_3^2m_4^3-459x_3^3m_4^3$
$-1152x_1^2x_4m_4^3-2079x_1x_2x_4m_4^3-1152x_2^2x_4m_4^3-2079x_1x_3x_4m_4^3-2079x_2x_3x_4m_4^3$
$-1152x_3^2x_4m_4^3-1152x_1x_4^2m_4^3-1152x_2x_4^2m_4^3-1152x_3x_4^2m_4^3-459x_4^3m_4^3$
$-1152x_1^2x_5m_4^3-2079x_1x_2x_5m_4^3-1152x_2^2x_5m_4^3-2079x_1x_3x_5m_4^3-2079x_2x_3x_5m_4^3$
$-1152x_3^2x_5m_4^3-2079x_1x_4x_5m_4^3-2079x_2x_4x_5m_4^3-2079x_3x_4x_5m_4^3-1152x_4^2x_5m_4^3-1152x_1x_5^2m_4^3$
$-1152x_2x_5^2m_4^3-1152x_3x_5^2m_4^3-1152x_4x_5^2m_4^3-459x_5^3m_4^3+798x_1^2m_1m_4^3+1458x_1x_2m_1m_4^3$
$+798x_2^2m_1m_4^3+1458x_1x_3m_1m_4^3+1458x_2x_3m_1m_4^3+798x_3^2m_1m_4^3+1458x_1x_4m_1m_4^3$
$+1458x_2x_4m_1m_4^3+1458x_3x_4m_1m_4^3+798x_4^2m_1m_4^3+1458x_1x_5m_1m_4^3+1458x_2x_5m_1m_4^3$
$+1458x_3x_5m_1m_4^3+1458x_4x_5m_1m_4^3+798x_5^2m_1m_4^3-402x_1m_1^2m_4^3-402x_2m_1^2m_4^3-402x_3m_1^2m_4^3$
$-402x_4m_1^2m_4^3-402x_5m_1^2m_4^3+54m_1^3m_4^3+798x_1^2m_2m_4^3+1458x_1x_2m_2m_4^3+798x_2^2m_2m_4^3$
$+1458x_1x_3m_2m_4^3+1458x_2x_3m_2m_4^3+798x_3^2m_2m_4^3+1458x_1x_4m_2m_4^3+1458x_2x_4m_2m_4^3$
$+1458x_3x_4m_2m_4^3+798x_4^2m_2m_4^3+1458x_1x_5m_2m_4^3+1458x_2x_5m_2m_4^3+1458x_3x_5m_2m_4^3$
$+1458x_4x_5m_2m_4^3+798x_5^2m_2m_4^3-1002x_1m_1m_2m_4^3-1002x_2m_1m_2m_4^3-1002x_3m_1m_2m_4^3$
$-1002x_4m_1m_2m_4^3-1002x_5m_1m_2m_4^3+279m_1^2m_2m_4^3-402x_1m_2^2m_4^3$
$-402x_2m_2^2m_4^3-402x_3m_2^2m_4^3-402x_4m_2^2m_4^3-402x_5m_2^2m_4^3+279m_1m_2^2m_4^3$
$+54m_2^3m_4^3+798x_1^2m_3m_4^3+1458x_1x_2m_3m_4^3+798x_2^2m_3m_4^3+1458x_1x_3m_3m_4^3$
$+1458x_2x_3m_3m_4^3+798x_3^2m_3m_4^3+1458x_1x_4m_3m_4^3+1458x_2x_4m_3m_4^3+1458x_3x_4m_3m_4^3$
$+798x_4^2m_3m_4^3+1458x_1x_5m_3m_4^3+1458x_2x_5m_3m_4^3+1458x_3x_5m_3m_4^3+1458x_4x_5m_3m_4^3$
$+798x_5^2m_3m_4^3-1002x_1m_1m_3m_4^3-1002x_2m_1m_3m_4^3-1002x_3m_1m_3m_4^3$
$-1002x_4m_1m_3m_4^3-1002x_5m_1m_3m_4^3+279m_1^2m_3m_4^3-1002x_1m_2m_3m_4^3$
$-1002x_2m_2m_3m_4^3-1002x_3m_2m_3m_4^3-1002x_4m_2m_3m_4^3-1002x_5m_2m_3m_4^3$
$+684m_1m_2m_3m_4^3+279m_2^2m_3m_4^3-402x_1m_3^2m_4^3-402x_2m_3^2m_4^3-402x_3m_3^2m_4^3$
$-402x_4m_3^2m_4^3-402x_5m_3^2m_4^3+279m_1m_3^2m_4^3+279m_2m_3^2m_4^3+54m_3^3m_4^3+54x_1^2m_4^4$

$$+99x_1x_2m_4^4+54x_2^2m_4^4+99x_1x_3m_4^4+99x_2x_3m_4^4+54x_3^2m_4^4+99x_1x_4m_4^4+99x_2x_4m_4^4$$
$$+99x_3x_4m_4^4+54x_4^2m_4^4+99x_1x_5m_4^4+99x_2x_5m_4^4+99x_3x_5m_4^4+99x_4x_5m_4^4$$
$$+54x_5^2m_4^4-72x_1m_1m_4^4-72x_2m_1m_4^4-72x_3m_1m_4^4-72x_4m_1m_4^4$$
$$-72x_5m_1m_4^4+21m_1^2m_4^4-72x_1m_2m_4^4-72x_2m_2m_4^4-72x_3m_2m_4^4$$
$$-72x_4m_2m_4^4-72x_5m_2m_4^4+51m_1m_2m_4^4+21m_2^2m_4^4-72x_1m_3m_4^4$$
$$-72x_2m_3m_4^4-72x_3m_3m_4^4-72x_4m_3m_4^4-72x_5m_3m_4^4+51m_1m_3m_4^4$$
$$+51m_2m_3m_4^4+21m_3^2m_4^4)$$