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'.

Keywords. inductive, combinatorial Nullstellensatz, Vandermonde polynomial, symmetric group

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 non-negative integers such that $t_i<|S_i|$ for i=1,2,...,n. Let $P(x_1,\ldots,x_n)$ 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 $P(x_1,\ldots,x_n)$ is nonzero. Then there exist elements $s_1\in S_1,\ldots,s_n\in S_n$ for which $P(s_1,\ldots,s_n)\neq 0$.

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

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

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 $f(a_1,...,a_n)\neq 0$, then the degree of $f(a_1,...,a_n)$ is $(n-1)^2$. And $x_1^{n-1}x_2^{n-1}\cdots x_{n-1}^{n-1}$ is a monomial the total degree of which is $(n-1)^2$, 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 $|S_1|=|S_2|=\cdots=|S_n|=n>n-1$, 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 $f(x_1,\ldots,x_n)$ by the so-called Vandermonde polynomial (see, for example, [3, pp. 346–347]), a new polynomial is created as follows.

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

The elements $a_1,a_2,\ldots,a_n$ are required to be distinct if the new polynomial is nonzero when $x_i=a_i$ for any i such that $1\le i\le n$. 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

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

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.

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

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 $x_1^3 x_2$, $x_1^3 x_3$ 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.

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

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

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

$$\begin{aligned}
& f(a_{\pi(1)}, a_{\pi(2)}, a_{\pi(3)}) = \\
& (a_{\pi(1)}-m_1)(a_{\pi(1)}-m_2)(a_{\pi(1)}+a_{\pi(2)}-m_1)(a_{\pi(1)}+a_{\pi(2)}-m_2) \\
& \quad \neq 0. \qquad (10)
\end{aligned}$$

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.

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

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.

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 $\mathrm{s}=a_1+a_2+\cdots+a_n$. A grasshopper is to jump along the real axis, starting at the point 0 and making n jumps to the right with lengths $a_1, a_2, \dots, a_n$ 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 $a_1, a_2, \dots, a_n$. Without the loss of generality, we can denote the largest element of A by a_1.

And for M=$\{m_1, m_2, \dots, m_{n-1}\}$ 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=$\{a_1, a_2, \dots, a_n\}$ and M=$\{m_1, m_2, \dots, m_{n-1}\}$. 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, $(a_1, a_2, \dots, a_{k+1})$. Now $a_1 < m_1$. We consider a series of k jumps $(a_2, \dots, a_k, a_{k+1})$ starting from a_1. For this case, we may regard A=$\{a_2, \dots, a_k, a_{k+1}\}$ and M=$\{m_1 - a_1, \dots, m_k - a_1\}$ 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=$\{m_2 - a_1, \dots, m_k - a_1\}$. So the claim of the problem follows, in short, there is at least one permutation of $(a_2, \dots, a_k, a_{k+1})$ that let a grasshopper jump safe without blocked.

If we denote this series of k jumps by $(a_{h2}, \dots, a_{hk}, a_{h(k+1)})$, the total series of k+1 jumps $(a_1, a_{h2}, \dots, a_{hk}, a_{h(k+1)})$ 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 $(a_{h(l+1)}, a_2, \dots, a_{h(l-1)}, a_1, a_{h(l+1)}, \dots, a_{h(k+1)})$ 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, $(a_1, a_2, \dots, a_{k+1})$. Now $a_1=m_1$. We consider a series of k jumps $(a_2, \dots, a_k, a_{k+1})$ starting from a_1. For this case, we may regard A=$\{a_2, \dots, a_k, a_{k+1}\}$ and M=$\{m_2-a_1, \dots, m_k-a_1\}$ 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 $(a_2, \dots, a_k, a_{k+1})$ that let a grasshopper jump safe without blocked.

If we denote this series of k jumps by $(a_{h2}, \dots, a_{hk}, a_{h(k+1)})$, the total series of k+1 jumps $(a_1, a_{h2}, \dots, a_{hk}, a_{h(k+1)})$ 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 $(a_{h2}, a_1, \dots, a_{hk}, a_{h(k+1)})$ 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, $(a_1, a_2, \dots, a_{k+1})$. Now $m_j<a_1<m_{j+1}$(for an integer j such that 2≤j≤k). We consider a series of k jumps $(a_2, \dots, a_k, a_{k+1})$ starting from a_1. For this case, we may regard A=$\{a_2, \dots, a_k, a_{k+1}\}$ and M=$\{m_{j+1}-a_1, \dots, m_k-a_1\}$ 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 $(a_2, \dots, a_k, a_{k+1})$ 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 $(a_{h2}, \dots, a_{hk}, a_{h(k+1)})$, the total series of k+1 jumps $(a_1, a_{h2}, \dots, a_{hk}, a_{h(k+1)})$ 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, $(a_1, a_2, \dots, a_{k+1})$. 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 $\{a_2, \dots, a_{k+1}\}$ 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.

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Appendix

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

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

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

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

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

$+1458x_3x_4m_1m_2^3+798x_4^2m_1m_2^3+1458x_1x_5m_1m_2^3+1458x_2x_5m_1m_2^3+1458x_3x_5m_1m_2^3$
$+1458x_4x_5m_1m_2^3+798x_5^2m_1m_2^3-402x_1m_1^2m_2^3-402x_2m_1^2m_2^3-402x_3m_1^2m_2^3$
$-402x_4m_1^2m_2^3-402x_5m_1^2m_2^3+54m_1^3m_2^3+54x_1^2m_2^4+99x_1x_2m_2^4+54x_2^2m_2^4$
$+99x_1x_3m_2^4+99x_2x_3m_2^4+54x_3^2m_2^4+99x_1x_4m_2^4+99x_2x_4m_2^4+99x_3x_4m_2^4$
$+54x_4^2m_2^4+99x_1x_5m_2^4+99x_2x_5m_2^4+99x_3x_5m_2^4+99x_4x_5m_2^4+54x_5^2m_2^4$
$-72x_1m_1m_2^4-72x_2m_1m_2^4-72x_3m_1m_2^4-72x_4m_1m_2^4-72x_5m_1m_2^4+21m_1^2m_2^4$
$-1516x_1^5m_3-5404x_1^4x_2m_3-9094x_1^3x_2^2m_3-9094x_1^2x_2^3m_3-5404x_1x_2^4m_3$
$-1516x_2^5m_3-5404x_1^4x_3m_3-16178x_1^3x_2x_3m_3$
$-22010x_1^2x_2^2x_3m_3-16178x_1x_2^3x_3m_3$
$-5404x_2^4x_3m_3-9094x_1^3x_3^2m_3-22010x_1^2x_2x_3^2m_3-22010x_1x_2^2x_3^2m_3-9094x_2^3x_3^2m_3$
$-9094x_1^2x_3^3m_3-16178x_1x_2x_3^3m_3-9094x_2^2x_3^3m_3-5404x_1x_3^4m_3-5404x_2x_3^4m_3$
$-1516x_3^5m_3-5404x_1^4x_4m_3-16178x_1^3x_2x_4m_3-22010x_1^2x_2^2x_4m_3-16178x_1x_2^3x_4m_3$
$-5404x_2^4x_4m_3-16178x_1^3x_3x_4m_3-38946x_1^2x_2x_3x_4m_3-38946x_1x_2^2x_3x_4m_3$
$-16178x_2^3x_3x_4m_3-22010x_1^2x_3^2x_4m_3-38946x_1x_2x_3^2x_4m_3-22010x_2^2x_3^2x_4m_3$
$-16178x_1x_3^3x_4m_3-16178x_2x_3^3x_4m_3-5404x_3^4x_4m_3-9094x_1^3x_4^2m_3$
$-22010x_1^2x_2x_4^2m_3-22010x_1x_2^2x_4^2m_3$
$-9094x_2^3x_4^2m_3-22010x_1^2x_3x_4^2m_3-38946x_1x_2x_3x_4^2m_3-22010x_2^2x_3x_4^2m_3$
$-22010x_1x_3^2x_4^2m_3-22010x_2x_3^2x_4^2m_3$
$-9094x_3^3x_4^2m_3-9094x_1^2x_4^3m_3$
$-16178x_1x_2x_4^3m_3-9094x_2^2x_4^3m_3-16178x_1x_3x_4^3m_3-16178x_2x_3x_4^3m_3$
$-9094x_3^2x_4^3m_3-5404x_1x_4^4m_3-5404x_2x_4^4m_3-5404x_3x_4^4m_3-1516x_4^5m_3$
$-5404x_1^4x_5m_3-16178x_1^3x_2x_5m_3-22010x_1^2x_2^2x_5m_3-16178x_1x_2^3x_5m_3-5404x_2^4x_5m_3$
$-16178x_1^3x_3x_5m_3-38946x_1^2x_2x_3x_5m_3-38946x_1x_2^2x_3x_5m_3-16178x_2^3x_3x_5m_3$
$-22010x_1^2x_3^2x_5m_3-38946x_1x_2x_3^2x_5m_3-22010x_2^2x_3^2x_5m_3-16178x_1x_3^3x_5m_3$
$-16178x_2x_3^3x_5m_3-5404x_3^4x_5m_3-16178x_1^3x_4x_5m_3-38946x_1^2x_2x_4x_5m_3$
$-38946x_1x_2^2x_4x_5m_3-16178x_2^3x_4x_5m_3-38946x_1^2x_3x_4x_5m_3-68700x_1x_2x_3x_4x_5m_3$
$-38946x_2^2x_3x_4x_5m_3-38946x_1x_3^2x_4x_5m_3-38946x_2x_3^2x_4x_5m_3-16178x_3^3x_4x_5m_3$
$-22010x_1^2x_4^2x_5m_3-38946x_1x_2x_4^2x_5m_3-22010x_2^2x_4^2x_5m_3-38946x_1x_3x_4^2x_5m_3$
$-38946x_2x_3x_4^2x_5m_3-22010x_3^2x_4^2x_5m_3-16178x_1x_4^3x_5m_3$
$-16178x_2x_4^3x_5m_3-16178x_3x_4^3x_5m_3$
$-5404x_4^4x_5m_3-9094x_1^3x_5^2m_3-22010x_1^2x_2x_5^2m_3-22010x_1x_2^2x_5^2m_3-9094x_2^3x_5^2m_3$
$-22010x_1^2x_3x_5^2m_3-38946x_1x_2x_3x_5^2m_3-22010x_2^2x_3x_5^2m_3-22010x_1x_3^2x_5^2m_3$
$-22010x_2x_3^2x_5^2m_3-9094x_3^3x_5^2m_3-22010x_1^2x_4x_5^2m_3-38946x_1x_2x_4x_5^2m_3$
$-22010x_2^2x_4x_5^2m_3-38946x_1x_3x_4x_5^2m_3-38946x_2x_3x_4x_5^2m_3-22010x_3^2x_4x_5^2m_3$
$-22010x_1x_4^2x_5^2m_3-22010x_2x_4^2x_5^2m_3-22010x_3x_4^2x_5^2m_3-9094x_4^3x_5^2m_3$
$-9094x_1^2x_5^3m_3-16178x_1x_2x_5^3m_3-9094x_2^2x_5^3m_3-16178x_1x_3x_5^3m_3-16178x_2x_3x_5^3m_3$
$-9094x_3^2x_5^3m_3-16178x_1x_4x_5^3m_3-16178x_2x_4x_5^3m_3-16178x_3x_4x_5^3m_3-9094x_4^2x_5^3m_3$
$-5404x_1x_5^4m_3-5404x_2x_5^4m_3-5404x_3x_5^4m_3-5404x_4x_5^4m_3-1516x_5^5m_3+3450x_1^4m_1m_3$
$+10664x_1^3x_2m_1m_3+14674x_1^2x_2^2m_1m_3+10664x_1x_2^3m_1m_3+3450x_2^4m_1m_3+10664x_1^3x_3m_1m_3$
$+26298x_1^2x_2x_3m_1m_3+26298x_1x_2^2x_3m_1m_3+10664x_2^3x_3m_1m_3+14674x_1^2x_3^2m_1m_3$
$+26298x_1x_2x_3^2m_1m_3+14674x_2^2x_3^2m_1m_3+10664x_1x_3^3m_1m_3+10664x_2x_3^3m_1m_3$

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

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

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

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

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

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

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

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

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

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

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

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

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