Method for discomposing the product of two primes.

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0- Abstract:

This paper is a solution for the problem of optimization in the discomposing a composite natural number formed by the product of two primes.

1- The method:

The final result of this method should be the equation:

$$(1) \quad p_a \cdot p_b = k$$

Where: $p_a, p_b \in P$ and $k \in \mathbb{N} \setminus P$

The first step is take the given number k and do the ceiling function of the square root of the number:

$$(2) \quad \lceil \sqrt{k} \rceil = s$$

Where: $s \in \mathbb{N}$

The second step is to take the bigger primer number less than s:

$$(3) \quad p_n < s$$

Where: $p_n \in P$ and p_n is the last prime on the real line less than s.

Thirdly, we should divide k by p_n to obtain a natural number t_1 :

$$(4) \quad k \div p_n = t_1$$

Then, if $t_1 \in P$ we know that $k = p_n \cdot t_1$ and we can equal $p_n = p_a$ and $t_1 = p_b$; if $t_1 \notin P$ we should find $p_{(n-1)}$ and divide k by $p_{(n-1)}$ to obtain t_2 , then if $t_2 \in P$ we know that $k = p_{(n-1)} \cdot t_2$ and we can equal $p_{(n-1)} = p_a$ and $t_2 = p_b$; if $t_2 \notin P$ we should find $p_{(n-2)}$ and so on. We should continue until $t_n \in P$.

2- Examples:

- Number 35. $\lceil\sqrt{35}\rceil=6 \Rightarrow p_n=5 \Rightarrow 35\div5=7 \Rightarrow 7\in P \Rightarrow 5\cdot7=35$
- Number 34 $\lceil\sqrt{34}\rceil=6 \Rightarrow p_n=5 \Rightarrow 34\div5=6{,}8 \Rightarrow 6{,}8\notin P \Rightarrow p_{(n-1)}=3 \Rightarrow 34\div3=11{,}\hat{3}$

$11{,}\hat{3}\notin P \Rightarrow p_{(n-2)}=2 \Rightarrow 34\div2=17 \Rightarrow 17\in P \Rightarrow 2\cdot17=34$

- Number 289 $\lceil\sqrt{289}\rceil=17 \Rightarrow p_n=17 \Rightarrow 289\div17=17 \Rightarrow 17\in P \Rightarrow 17\cdot17=289$
- Number 2021 $\lceil\sqrt{2021}\rceil=45 \Rightarrow p_n=43 \Rightarrow 2021\div43=47 \Rightarrow 47\in P \Rightarrow 43\cdot47=2021$
- Number 481 $\lceil\sqrt{481}\rceil=22 \Rightarrow p_n=19 \Rightarrow 481\div19=25{,}31 \Rightarrow 25{,}31\notin P \Rightarrow p_{(n-1)}=17$
  $481\div17=28{,}29 \Rightarrow 28{,}29\notin P \Rightarrow p_{(n-2)}=13 \Rightarrow 481\div13=37 \Rightarrow 37\in P \Rightarrow 13\cdot37=481$

3- Required steps:

If p_a is the small prime and p_b is the large prime, variation (Δp) is what conditions how many steps we must take to obtain the result.

$$(5) \quad \Delta p=p_b-p_a$$

More steps will be required the larger Δp .

4- Conclusions:

This is in my opinion very interesting mathematics, applied to big numbers we can approach to theories and applications like the RSA cryptosystem and with the capacity of big data computers we can use this method for encrypt and unencryp.