The number of twin primes

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Abstract :

It is proved that there is formula for counting exactly the number of (p ; p+2) lower than an integer , we use in this formula the arithmetic progressions and the cardinal of the set .

Notations :

$n \in N^*$

$\pi(p; p+2)$ *: The number of twin primes*

$\pi_{(p;p+2)}(36n^2 + 60n + 21)$ *:* $\pi(p; p+2) \; < \; 36n^2 + 60n + 21$

$|A|$ *: The cardinal of a set A*

v_0 *: The first terms of the arithmetic progressions*

r *: The basics of the arithmetic progressions*

$l(v_0; r)$ *: The length of the arithmetic progression which has the first term* v_0 *and the basic r*

Formula :

$$\boldsymbol{\pi_{(p;p+2)}\left(36n^2 + 60n + 21\right) = G_n}$$

$$\boldsymbol{l(v_0; r) = \left\lceil \frac{(6n^2+10n+2)-v_0}{r} \right\rceil}$$

$$\boldsymbol{G_n = \left(6n^2 + 10n + 4\right) - \left| \bigcup_{a=1}^{n} \left(\begin{array}{l} \left((5a-3) + b\,(6a-1)\right) \cup \\ \left((7a-3) + b\,(6a-1)\right) \cup \\ \left((5a-1) + b\,(6a+1)\right) \cup \\ \left((7a-1) + b\,(6a+1)\right) \end{array} \right) \right|}$$

Some examples :

$\boldsymbol{n = 1}$

$\boldsymbol{\pi_{(p;p+2)}(117)}$= $\boldsymbol{G_1}$ ***= 10***

$$G_1 = 20 - \left| \begin{pmatrix} (2+b5) \cup & l(2;5) = \left\lceil \frac{(18)-2}{\mathbf{5}} \right\rceil = \lceil 3.2 \rceil = 4 \\ (4+b5) \cup & l(4;5) = \left\lceil \frac{(18)-4}{\mathbf{5}} \right\rceil = \lceil 2.8 \rceil = 3 \\ (4+b7) \cup & l(4;7) = \left\lceil \frac{(18)-4}{\mathbf{7}} \right\rceil = \lceil 2 \rceil = 2 \\ (6+b7) & l(6;7) = 2 \end{pmatrix} \right|$$

$$= 20 - \left| \begin{pmatrix} (2 \quad 7 \quad 12 \quad 17) \cup \\ (4 \quad 9 \quad 14) \cup \\ (4 \quad 11) \cup \\ (6 \quad 13) \end{pmatrix} \right|$$

$$= 20 - \left| (2 \quad 4 \quad 6 \quad 7 \quad 9 \quad 11 \quad 12 \quad 13 \quad 14 \quad 17) \right|$$

$$= 20 - 10$$

$$= 10$$

$\boldsymbol{n = 2}$

$\boldsymbol{\pi_{(p;p+2)}(285)}$= $\boldsymbol{G_2 = 19}$

$$l(v_0;r) = \left\lceil \frac{(46)-v_0}{r} \right\rceil$$

$$G_2 = 48 \quad - \quad \left| \bigcup_{a=1}^{2} \begin{pmatrix} \big((5a-3)+b\,(6a-1)\big) \;\cup \\ (\,(7a-3)+b\,(6a-1)\,) \;\cup \\ (\,(5a-1)+b\,(6a+1)\,) \;\cup \\ (\,(7a-1)+b\,(6a+1)\,) \end{pmatrix} \right|$$

$$= 48 \;-\; \left| \left(\begin{pmatrix} (2+b\,5) & \cup & l=9 \\ (4+b\,5) & \cup & l=9 \\ (4+b\,7) & \cup & l=6 \\ (6+b\,7) & & l=6 \end{pmatrix} \cup \begin{pmatrix} (7+b\,11) & \cup & l=4 \\ (11+b\,11) & \cup & l=4 \\ (9+b\,13) & \cup & l=3 \\ (13+b\,13) & & l=3 \end{pmatrix} \right) \right|$$

$$= 48 \;-\; \left| \begin{pmatrix} (2 \;\; 7 \;\; 12 \;\; 17 \;\; 22 \;\; 27 \;\; 32 \;\; 37 \;\; 42) \;\cup \\ (4 \;\; 9 \;\; 14 \;\; 19 \;\; 24 \;\; 29 \;\; 34 \;\; 39 \;\; 44) \;\cup \\ (4 \;\; 11 \;\; 18 \;\; 25 \;\; 32 \;\; 39) \;\cup \\ (6 \;\; 13 \;\; 20 \;\; 27 \;\; 34 \;\; 41) \;\cup \\ (7 \;\; 18 \;\; 29 \;\; 40) \;\cup \\ (11 \;\; 22 \;\; 33 \;\; 44) \;\cup \\ (9 \;\; 22 \;\; 35) \;\cup \\ (13 \;\; 26 \;\; 39) \end{pmatrix} \right|$$

$$= 48 - \left| \begin{bmatrix} 2 & 4 & 6 & 7 & 9 & 11 & 12 & 13 & 14 & 17 & 18 & 19 & 20 & 22 & 24 & 25 & 26 \\ 27 & 29 & 32 & 33 & 34 & 35 & 37 & 39 & 40 & 41 & 42 & 44 \end{bmatrix} \right|$$

= 48 - 29

= 19

n=3

$\boldsymbol{\pi_{(p;p+2)}(525)}$= $\boldsymbol{G_3}$ ***= 25***

$$G_3 = 88 - \left| \begin{matrix} l(v_0;r) = \left\lceil \frac{(86)-v_0}{r} \right\rceil \\ \bigcup_{a=1}^{3} \begin{pmatrix} ((5a-3)+b\,(6a-1)) \cup \\ ((7a-3)+b\,(6a-1)) \cup \\ ((5a-1)+b\,(6a+1)) \cup \\ ((7a-1)+b\,(6a+1)) \end{pmatrix} \end{matrix} \right|$$

$$= 88 - \left| \begin{pmatrix} (2+b\,5) & \cup & l = 17 \\ (4+b\,5) & \cup & l = 17 \\ (4+b\,7) & \cup & l = 12 \\ (6+b\,7) & \cup & l = 12 \\ (7+b\,11) & \cup & l = 8 \\ (11+b\,11) & \cup & l = 7 \\ (9+b\,13) & \cup & l = 6 \\ (13+b\,13) & \cup & l = 6 \\ (12+b\,17) & \cup & l = 5 \\ (18+b\,17) & \cup & l = 4 \\ (14+b\,19) & \cup & l = 4 \\ (20+b\,19) & & l = 4 \end{pmatrix} \right|$$

$$=88-\left|\left(\begin{array}{ll} (2\ 7\ 12\ 17\ 22\ 27\ 32\ 37\ 42\ 47\ 52\ 57\ 62\ 67\ 72\ 77\ 82) & \cup \\ (4\ 9\ 14\ 19\ 24\ 29\ 34\ 39\ 44\ 49\ 54\ 59\ 64\ 69\ 74\ 79\ 84) & \cup \\ (4\ 11\ 18\ 25\ 32\ 39\ 46\ 53\ 60\ 67\ 74\ 81) & \cup \\ (6\ 13\ 20\ 27\ 34\ 41\ 48\ 55\ 62\ 69\ 76\ 83) & \cup \\ (7\ 18\ 29\ 40\ 51\ 62\ 73\ 84) & \cup \\ (11\ 22\ 33\ 44\ 55\ 66\ 77) & \cup \\ (9\ 22\ 35\ 48\ 61\ 74) & \cup \\ (13\ 26\ 39\ 52\ 65\ 78) & \cup \\ (12\ 29\ 46\ 63\ 80) & \cup \\ (18\ 35\ 52\ 69) & \cup \\ (14\ 33\ 52\ 71) & \cup \\ (20\ 39\ 58\ 77) & \end{array}\right)\right|$$

$$=88-\left|\left(\begin{array}{l} 2\ 4\ 6\ 7\ 9\ 11\ 12\ 13\ 14\ 17\ 18\ 19\ 20\ 22\ 24\ 25\ 26\ 27\ 29\ 32\ 33\ 34\ 35\ 37\ 39 \\ 40\ 41\ 42\ 44\ 46\ 47\ 48\ 49\ 51\ 52\ 53\ 54\ 55\ 57\ 58\ 59\ 60\ 61\ 62\ 63\ 64\ 65\ 66 \\ 67\ 69\ 71\ 72\ 73\ 74\ 76\ 77\ 78\ 79\ 80\ 81\ 82\ 83\ 84 \end{array}\right)\right|$$

$= 88 - 63$

$= 25$

The twin primes to check :

(3 ; 5) , (5 ; 7) , (11 ; 13) , (17 ; 19) , (29 ; 31) , (41 ; 43) , (59 ; 61) , (71 ; 73) , (101 ; 103) , (107 ; 109) , (137 ; 139) , (149 ; 151) , (179 ; 181) , (191 ; 193) , (197 ; 199) ; (227 ; 229) , (239 ; 241) , (269 ; 271) , (281 ; 283) , (311 ; 313) , (347 ; 349) , (419 ; 421) , (431 ; 433) , (461 ; 463) , (521 ; 523) , (569 ; 571) …

The result :

$$\pi(p; p+2) = \lim \quad G_n$$

Calculate the limit of G_n means twin prime conjecture proof

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No home , no study , no job

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My dream is study English language and mathematics and prove twin prime conjecture

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