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Prime Number Generating Polynomial $3n^2 + 3n + 23$

Research Article

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Abstract: A prime number is positive integer which does not divisible by any integers except 1 and itself. Up to now there is no any polynomial which generates all primes. There are few polynomial generate finite primes. In this paper I am giving a new polynomial which generating prime numbers from n= 0 to 21.

MSC: 11A41, 11N32.

Keywords: Polynomial, Prime Numbers, Prime-generating polynomial.

1. Introduction

A positive integer which divisible only with 1 and itself such positive numbers called as prime number. A set of all prime numbers is often denoted by P. As per Euler proof there are infinitely many primes. There is no known simple formula to generate all prime numbers. Legender showed that there is no rational algebraic function which always gives primes. In 1752 Goldbach showed that no polynomial with integer coefficients can give a prime for all integer values. However there exists a polynomial in 10 variables with integer coefficients such that the set of prime equal the set of positive values of these polynomials. The best known polynomial that generate possibly only prime numbers is n^2+n+41 due to Euler which gives distinct prime for the 40 consecutive integers n=0 to 39. In the table is indicates the number of distinct primes generated by the polynomial when values from 0 to n are plugged in

Polynomial	Prime from 0 to n	Distinct Primes	Reference
$\frac{1}{4}\left(n^5 - 133n^4 + 6729n^3 - 158379n^2 + 1720294n - 6823316\right)$	56	57	Dress and Landreau (2002), Gupta(2006)
$\frac{1}{36}\left(n^6 - 126n^5 + 6217n^4 - 153066n^3 + 1987786n^2 - 13055316n + 34747236\right)$	54	55	Wroblewski and Meyrignac (2006)
$n^4 - 97n^3 + 3294n^2 - 45458n + 213589$	49	49	Beyleveld (2006)
$n^5 - 99n^4 + 3588n^3 - 56822n^2 + 348272n - 286397$	46	47	Wroblewski and Meyrignac (2006)
$-66n^3 + 3845n^2 - 60897n + 251831$	45	46	Kazmenko and Trofimov (2006)
$36n^2 - 810n + 2753$	44	45	Fung and Ruby
$3n^3 - 183n^2 + 3318n - 18757$	46	43	S.M. Ruiz
$47n^2 - 1701n + 10181$	42	43	Fung and Ruby
$103n^2 - 4707n + 50383$	42	43	Speiser
$n^2 - n + 41$	40	40	Euler
$42n^3 + 270n^2 - 26436n + 250703$	39	40	Wroblewski and Meyrignac
$8n^2 - 488n + 7243$	61	31	F. Gobbo
$6n^2 - 342n + 4903$	57	29	J.Brox
$2n^2 + 29$	28	29	Legendre

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Polynomial	Prime from 0 to n	Distinct Primes	Reference
$7n^2 - 371n + 4871$	23	24	F.Gobbo
$n^4 + 29n^2 + 101$	19	20	E.Pegg
$3n^2 + 39n + 37$	17	18	A.Bruno
$n^2 + n + 17$	15	16	Legendre
$4n^2 + 4n + 59$	13	14	Honaker
$2n^2 + 11$	10	11	——-
$n^3 + n^2 + 17$	10	11	———
$2n^2 + 29$	28	29	Legendre
$7n^2 - 371n + 4871$	23	24	F.Gobbo
$n^4 + 29n^2 + 101$	19	20	E.Pegg
$3n^2 + 39n + 37$	17	18	A.Bruno
$n^2 + n + 17$	15	16	Legendre
$4n^2 + 4n + 59$	13	14	Honaker
$2n^2 + 11$	10	11	——-
$n^3 + n^2 + 17$	10	11	———

In this paper I am showing a prime number generating polynomial from 0 to 21

2. Main Result

A polynomial $3n^2 + 3n + 23$ is a distinct prime numbers generating polynomial from n=0 to 21. These polynomial generating distinct primes are more then $n^4 + 29n^2 + 101\,(E.Pegg)$, $3n^2 + 39n + 37\ (A.Bruno)$, $n^2 + n + 17\ (Legendre)$, $4n^2 + 4n + 59\ (Honaker)$, $2n^2 + 11$, $n^3 + n^2 + 17$ polynomials.

In this table listed all primes of $3n^2 + 3n + 23$ polynomial.

n	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
$3n^2 + 3 + 23$	23	29	41	59	83	113	149	191	239	293	353	419	491	569	653	743	839	1049	1163	1163	1283	1409

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