

Padrão prime sublists within lists (a definite prime pattern thorough a polynomial counting mod)

Seq1 is the list of the positions of the primes that share the same mod sequence and seq2 is the result of the $\text{Mod}\{1693,420\}+420n$ until 40. Now observe the result of FindInstance for seq1 and 2 and look that they are the same result ...

```
(* Defina as sequências *)
```

```
seq1 = {32, 164, 280, 488, 541, 640, 689, 738, 785, 976, 1020, 1113, 1159, 1208, 1253, 1297, 1383, 1564, 1689, 1738, 1829, 1873, 1953, 1995, 2084, 2162};
```

```
seq2 = {131, 551, 971, 1391, 1811, 2231, 2651, 3071, 3491, 3911, 4331, 4751, 5171, 5591, 6011, 6431, 6851, 7271, 7691, 8111, 8531, 8951, 9371, 9791, 10211, 10631}
```

```
(* Calcular Mod[X, 131] para cada sequência *)
```

```
modSeq1 = Mod[#, 131] & /@ seq1;
```

```
modSeq2 = Mod[#, 131] & /@ seq2;
```

```
(* Mostrar os resultados *)
```

```
{modSeq1, modSeq2}
```

```
b=seq2-seq1
```

```
Differences[b]
```

```
c=Mod[seq2,seq1]
```

```
d=Mod[b,seq1]
```

```
{131,551,971,1391,1811,2231,2651,3071,3491,3911,4331,4751,5171,5591,6011,6431,6851,7271,7691,8111,8531,8951,9371,9791,10211,10631}
```

```
{{32,33,18,95,17,116,34,83,130,59,103,65,111,29,74,118,73,123,117,35,126,39,119,30,119,66},  
{0,27,54,81,108,4,31,58,85,112,8,35,62,89,116,12,39,66,93,120,16,43,70,97,124,20}}
```

```
{99,387,691,903,1270,1591,1962,2333,2706,2935,3311,3638,4012,4383,4758,5134,5468,5707,  
,6002,6373,6702,7078,7418,7796,8127,8469}
```

```
{288,304,212,367,321,371,371,373,229,376,327,374,371,375,376,334,239,295,371,329,376,340,378,331,342}
```

```
{3,59,131,415,188,311,584,119,351,7,251,299,535,759,999,1243,1319,1015,935,1159,1215,1459,1559,1811,1875,1983}
```

{3,59,131,415,188,311,584,119,351,7,251,299,535,759,999,1243,1319,1015,935,1159,1215,1459,1559,1811,1875,1983}

(* Defina a sequência seq2 *)

seq2 = {131, 551, 971, 1391, 1811, 2231, 2651, 3071, 3491, 3911, 4331, 4751, 5171, 5591, 6011, 6431, 6851, 7271, 7691, 8111, 8531, 8951, 9371, 9791, 10211, 10631}

(* Defina seq1 como uma variável simbólica *)

Clear[x];

seq1 = Array[x, Length[seq2]];

(* Calcular a diferença entre seq2 e seq1 *)

b = seq2 - seq1;

(* Calcular Mod[seq2, seq1] *)

c = Mod[seq2, seq1];

(* Calcular Mod[b, seq1] *)

d = Mod[b, seq1];

(* Resolver a equação c == d para encontrar os valores de seq1 *)

sol = FindInstance[c == d, seq1];

(* Mostrar os resultados *)

Sol

{131,551,971,1391,1811,2231,2651,3071,3491,3911,4331,4751,5171,5591,6011,6431,6851,7271,7691,8111,8531,8951,9371,9791,10211,10631}

{x[1]->171/10-(103 I)/5,x[2]->64/5+I/10,x[3]->92/5+(89 I)/5,x[4]->69/5-I/5,x[5]->17/2+(23 I)/10,x[6]->-(181/10)+(114 I)/5,x[7]->7/2+(43 I)/5,x[8]->19/2-(63 I)/10,x[9]->-(157/10)+(207 I)/10,x[10]->16/5-(217 I)/10,x[11]->-(4/5)+(79 I)/5,x[12]->18/5+10 I,x[13]->-(35/2)-(23 I)/10,x[14]->213/10-(49 I)/5,x[15]->-(102/5)+(89 I)/10,x[16]->-(29/2)-(5 I)/2,x[17]->-(43/10)+(77 I)/5,x[18]->161/10-(41 I)/5,x[19]->-18+(39 I)/2,x[20]->-10+(79 I)/10,x[21]->58/5-

```
(23 I)/10,x[22]->-(17/5)-6 I,x[23]->-(83/5)-(74 I)/5,x[24]->-(8/5)+(7 I)/2,x[25]->39/10+(247 I)/10,x[26]->11/2+23 I}}
```

```
(* Defina a sequência seq2 *)
```

```
seq1 = {32, 164, 280, 488, 541, 640, 689, 738, 785, 976, 1020, 1113, 1159, 1208, 1253, 1297, 1383, 1564, 1689, 1738, 1829, 1873, 1953, 1995, 2084, 2162};
```

```
(* Defina seq1 como uma variável simbólica *)
```

```
Clear[x];
```

```
seq1 = Array[x, Length[seq2]];
```

```
(* Calcular a diferença entre seq2 e seq1 *)
```

```
b = seq2 - seq1;
```

```
(* Calcular Mod[seq2, seq1] *)
```

```
c = Mod[seq2, seq1];
```

```
(* Calcular Mod[b, seq1] *)
```

```
d = Mod[b, seq1];
```

```
(* Resolver a equação c == d para encontrar os valores de seq1 *)
```

```
sol = FindInstance[c == d, seq1];
```

```
(* Mostrar os resultados *)
```

```
Sol
```

```
{{x[1]->171/10-(103 I)/5,x[2]->64/5+I/10,x[3]->92/5+(89 I)/5,x[4]->69/5-I/5,x[5]->17/2+(23 I)/10,x[6]->-(181/10)+(114 I)/5,x[7]->7/2+(43 I)/5,x[8]->19/2-(63 I)/10,x[9]->-(157/10)+(207 I)/10,x[10]->16/5-(217 I)/10,x[11]->-(4/5)+(79 I)/5,x[12]->18/5+10 I,x[13]->-(35/2)-(23 I)/10,x[14]->213/10-(49 I)/5,x[15]->-(102/5)+(89 I)/10,x[16]->-(29/2)-(5 I)/2,x[17]->-(43/10)+(77 I)/5,x[18]->161/10-(41 I)/5,x[19]->-18+(39 I)/2,x[20]->-10+(79 I)/10,x[21]->58/5-(23 I)/10,x[22]->-(17/5)-6 I,x[23]->-(83/5)-(74 I)/5,x[24]->-(8/5)+(7 I)/2,x[25]->39/10+(247 I)/10,x[26]->11/2+23 I}}
```

```
(* Defina as duas sequências seq2 *)
```

```
seq2a = {131, 551, 971, 1391, 1811, 2231, 2651, 3071, 3491, 3911, 4331, 4751, 5171, 5591,  
6011, 6431, 6851, 7271, 7691, 8111, 8531, 8951, 9371, 9791, 10211, 10631};
```

```
seq2b = {32, 164, 280, 488, 541, 640, 689, 738, 785, 976, 1020, 1113, 1159, 1208, 1253, 1297,  
1383, 1564, 1689, 1738, 1829, 1873, 1953, 1995, 2084, 2162};
```

```
(* Defina seq1 como uma variável simbólica *)
```

```
Clear[x];
```

```
seq1 = Array[x, Length[seq2a]];
```

```
(* Calcular a diferença entre seq2a e seq1 *)
```

```
b = seq2a - seq1;
```

```
(* Calcular Mod[seq2a, seq1] *)
```

```
c = Mod[seq2a, seq1];
```

```
(* Calcular Mod[b, seq1] *)
```

```
d = Mod[b, seq1];
```

```
(* Resolver a equação c == d para encontrar os valores de seq1 *)
```

```
sol = FindInstance[c == d, seq1];
```

```
(* Mostrar os resultados *)
```

```
sol
```

```
(* Comparar seq2a com seq2b e encontrar correspondências *)
```

```
matches = Table[seq2a[[i]] -> seq2b[[i]], {i, Length[seq2a]}]
```

```
(* Mostrar as correspondências *)
```

```
Matches
```

$\{x[1] \rightarrow 171/10 - (103 \text{ I})/5, x[2] \rightarrow 64/5 + \text{I}/10, x[3] \rightarrow 92/5 + (89 \text{ I})/5, x[4] \rightarrow 69/5 - \text{I}/5, x[5] \rightarrow 17/2 + (23 \text{ I})/10, x[6] \rightarrow -(181/10) + (114 \text{ I})/5, x[7] \rightarrow 7/2 + (43 \text{ I})/5, x[8] \rightarrow 19/2 - (63 \text{ I})/10, x[9] \rightarrow -(157/10) + (207 \text{ I})/10, x[10] \rightarrow 16/5 - (217 \text{ I})/10, x[11] \rightarrow -(4/5) + (79 \text{ I})/5, x[12] \rightarrow 18/5 + 10 \text{ I}, x[13] \rightarrow -(35/2) - (23 \text{ I})/10, x[14] \rightarrow 213/10 - (49 \text{ I})/5, x[15] \rightarrow -(102/5) + (89 \text{ I})/10, x[16] \rightarrow -(29/2) - (5 \text{ I})/2, x[17] \rightarrow -(43/10) + (77 \text{ I})/5, x[18] \rightarrow 161/10 - (41 \text{ I})/5, x[19] \rightarrow -18 + (39 \text{ I})/2, x[20] \rightarrow -10 + (79 \text{ I})/10, x[21] \rightarrow 58/5 - (23 \text{ I})/10, x[22] \rightarrow -(17/5) - 6 \text{ I}, x[23] \rightarrow -(83/5) - (74 \text{ I})/5, x[24] \rightarrow -(8/5) + (7 \text{ I})/2, x[25] \rightarrow 39/10 + (247 \text{ I})/10, x[26] \rightarrow 11/2 + 23 \text{ I}\}$

$\{131 \rightarrow 32,551 \rightarrow 164,971 \rightarrow 280,1391 \rightarrow 488,1811 \rightarrow 541,2231 \rightarrow 640,2651 \rightarrow 689,3071 \rightarrow 738,3491 \rightarrow 785,3911 \rightarrow 976,4331 \rightarrow 1020,4751 \rightarrow 1113,5171 \rightarrow 1159,5591 \rightarrow 1208,6011 \rightarrow 1253,6431 \rightarrow 1297,6851 \rightarrow 1383,7271 \rightarrow 1564,7691 \rightarrow 1689,8111 \rightarrow 1738,8531 \rightarrow 1829,8951 \rightarrow 1873,9371 \rightarrow 1953,9791 \rightarrow 1995,10211 \rightarrow 2084,10631 \rightarrow 2162\}$

$\{131 \rightarrow 32,551 \rightarrow 164,971 \rightarrow 280,1391 \rightarrow 488,1811 \rightarrow 541,2231 \rightarrow 640,2651 \rightarrow 689,3071 \rightarrow 738,3491 \rightarrow 785,3911 \rightarrow 976,4331 \rightarrow 1020,4751 \rightarrow 1113,5171 \rightarrow 1159,5591 \rightarrow 1208,6011 \rightarrow 1253,6431 \rightarrow 1297,6851 \rightarrow 1383,7271 \rightarrow 1564,7691 \rightarrow 1689,8111 \rightarrow 1738,8531 \rightarrow 1829,8951 \rightarrow 1873,9371 \rightarrow 1953,9791 \rightarrow 1995,10211 \rightarrow 2084,10631 \rightarrow 2162\}$