Glad Hobo Express

Friday, June 9

13532385396179 precursors

One of the nice things about having James Davis' counterexample to Conway's conjecture is that it leads directly to other counterexamples (i.e., numbers that evolve into it). For example: 13*5323^8*5396179, 13^53238*5396179, etc. Then one finds precursors of these numbers, and so on. Will this process eventually end? Is the total number of precursors, precursors of precursors, precursors of precursors of precursors, etc., finite?

Robert Gerbicz has kindly calculated 58 factorizations (13532385396179 plus 57 primary precursors, sorted and indexed here by number size; additionally, I show the <number of decimal digits>:

```
0.   13*53^2*3853*96179           <14>
1.   13*5323^8*5396179            <38>
2.   13*53^23*853*96179           <49>
3.   13^53*23*853*96179           <69>
4.   13^53*23^8*53*96179          <77>
5.   13^53*23^8*5396179           <77>
6.   13^53*23^8*53^9*61*79        <90>
```

perp

Hans Havermann

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 7.   13^53*23^8*53^9*617^9         <111>
 8.   13^53*23^8*53^9*61^79         <227>
 9.   13^53*23^8*53^96*179          <238>
10.   13*53^238*5396179             <419>
11.   13^532*3853*96179             <602>
12.   13^53*23^853*96179           <1226>
13.   13^53*23^8*53^961*79         <1729>
14.   13*5323^853*96179            <3185>
15.   13^5323*853*96179            <5938>
16.   13^53*23^8539*61*79         <11691>
17.   13^53*23^8539*617^9         <11712>
18.   13^53*23^8539*61^79         <11828>
19.   13*5323*8539^6179           <24298>
20.   13*53^23*8539^6179          <24333>
21.   13^53*23*8539^6179          <24353>
22.   13^5323*8539^6179           <30222>
23.   13*53^23853*96179           <41136>
24.   13*53238539^6179            <47742>
25.   13^53238*53*96179           <59311>
26.   13^53238*5396179            <59311>
27.   13^53238*53^9*61*79         <59324>
28.   13^53238*53^9*617^9         <59345>
29.   13^53238*53^9*61^79         <59461>
30.   13^53238*53^96*179          <59472>
31.   13^53238*53^961*79          <60964>
32.   13^53*23^85396*179         <116348>
33.   13^53*23^8*53^96179        <165910>
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```
34.   13^53238*53^96179          <225144>
35.   13*53^23*853^96179         <281937>
36.   13^53*23*853^96179         <281957>
37.   13^5323*853^96179          <287826>
38.   13*53^2*3853^96179         <344884>
39.   13^532*3853^96179          <345472>
40.   13*53^238539*61*79         <411312>
41.   13*53^238539*617^9         <411334>
42.   13*53^238539*61^79         <411450>
43.   13*5323853^96179           <646923>
44.   13^53*23^853961*79        <1162924>
45.   13*53^2385396*179         <4113085>
46.   13^5323853*96179          <5930476>
47.   13*53^23853961*79        <41130813>
48.   13^53238539*61*79        <59304721>
49.   13^53238539*617^9        <59304742>
50.   13^53238539*61^79        <59304858>
51.   13^53*23^85396179       <116286414>
52.   13*5323^85396179        <318199526>
53.   13^532385396*179        <593047175>
54.   13^532385396*17^9       <593047184>
55.   13*53^2385396179       <4113081073>
56.   13^5323853961*79       <5930471731>
57.   13^532385396179      <593047172939>
```

I have a work-in-progress version of this table that also shows secondary precursor counts.

Consider 13^532385396179. Take enough of its initial decimal digits to make a prime (*and* the next digit isn't zero; 68971066936841703995076128866117893410448319579 will do). Raise this to the power of the rest of the digits, thus creating a new (even larger) precursor. Repeat.

The number of initial decimal digits of 13^532385396179 that may be used as primes in the above argument is 47, 50, 449, 4341, 5798, ... The sequence is necessarily finite but will we ever know for certain when it is full?

Keep an eye out for new comments in Sloane's A195264.

Posted by Hans Havermann at 10:34 PM

1 comment:

James Davis June 10, 2017 at 1:51 AM

Really interesting point. So there may (should?) be infinite numbers that map to the fixed point. I wonder if the density of those could be non-zero. Seems like it should go to zero eventually...

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