Pensieve Header: Finding Euler and inverse Euler transforms ingeneral, and in particular, for n!.

```
PrimitivesToFull[p_List] := Module[
   {lp, x, ser},
   lp = Length[p];
   ser = Normal[Series[
      Product[(1 - x^i)^(-p[[i]]), {i, lp}],
      {x, 0, lp}
     ]];
   Table[Coefficient[ser, x, i], {i, 0, lp}]
  ];
FullToPrimitives[{1}] = {};
FullToPrimitives[{1, mid___, last_}] := Module[{prev},
  prev = FullToPrimitives[{1, mid}];
  Append[
   prev,
   last - Last[PrimitivesToFull[Append[prev, 0]]]
  ]
 ]
```

```
PrimitivesToFull[{2, 1, 1, 1, 1, 1, 1}]
```

```
{1, 2, 4, 7, 12, 19, 30, 45}
```

```
FullToPrimitives[{1, 2, 4, 7, 12, 19, 30, 45}]
```

```
{2, 1, 1, 1, 1, 1, 1}
```

```
seq = FullToPrimitives[Table[n!, {n, 0, 10}]]
```

```
{1, 1, 4, 17, 92, 572, 4156, 34 159, 314 368, 3 199 844}
```

```
FindSequenceFunction[seq]
```

```
FindSequenceFunction[{1, 1, 4, 17, 92, 572, 4156, 34 159, 314 368, 3 199 844}]
```

```
Import[
 "http://www.research.att.com/~njas/sequences/?q=1,1,4,17,92,572,4156,34159,314368,3199844
   &p=1&n=10&fmt=3"]
```

```
Search: 1, 1, 4, 17, 92, 572, 4156, 34159, 314368, 3199844
Results 1-1 of 1 results found.

%I A112354
%S A112354 1,1,4,17,92,572,4156,34159,314368,3199844,35703996,433421495,
%T A112354 5687955724,80256874912,1211781887796,19496946534720,333041104402860,
%U A112354 6019770246910128,114794574818830716,2303332661416242633
%N A112354 Inverse Euler transform of n!. Also the number of sequences of permutations
              with no global descents which are Lyndon (smallest in lexicographic
              order of all cyclic shifts of the sequences) where the size of the
              sequence = sum of sizes of the permutations.
%F A112354 Prod_{k>=1} 1/(1-q^k)^{a(k)} = Sum_{n>=0} n! x^n
%e A112354 a(3) = 4 because (123), (213), (132) and (1,21) are all Lyndon
%e A112354 a(4) = 17 because there are 13 permutations with no global descents of
              size 4 and (1,123), (1,213), (1,132) are all Lyndon
%e A112354 a(5) = 92 = 71 permutations with no global descents+13 sequences of the
              form (1,pi) where pi in S_4 with no global descents+(1,1,1,21),(1,
              21,21),(1,1,123),(1,1,213),(1,1,132),(21,123),(21,213),(21,132).
%p A112354 read transfoms; EULERi([seq(n!,n=1..30)]);
%Y A112354 Cf. A003319, A000142.
%Y A112354 Sequence in context: A058279 A143405 A141154 this_sequence A020011 A067084
              A123750
%Y A112354 Adjacent sequences: A112351 A112352 A112353 this_sequence A112355 A112356
              A112357
%K A112354 nonn
%O A112354 1,3
%A A112354 Mike Zabrocki (zabrocki(AT)mathstat.yorku.ca), Sep 05 2005

Search completed in 0.002 seconds
```