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G Almkvist

letter

2 pages

2 seqs

Lund, April 19, 1992

→ A7043

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Dear Neil;

Here are two sequences connected with
non commutative invariants. There are of course
many other examples.

Q: Are there any other examples of nested
roots giving integer sequences?

A: Yes! I will try to work out the examples
where you can solve the equations by
radicals (there should be one with 3rd roots...)

Best regards

Gert

Gert Almqvist

$\sqrt{f_{94}}$

%N Noncommutative $\mathbb{C}\langle SL(2, \mathbb{C}) \rangle$ -invariants
of degree n in 5 variables.

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%R JALG 93 189 214,

%O 0,5

1,0,1,1,5,16...

$$\frac{\sqrt{2}}{\sqrt{(1-t) \left\{ 1+5t + \sqrt{(1-5t)(1-t)} \right\}}} = 1+t^2+t^3+5t^4+16t^5 + 65t^6 + 260t^7 + 1085t^8 + \dots$$

$$= \sum_0^{\infty} \tilde{C}(4,n)t^n$$

where $\tilde{C}(4,n) = \#$ lin. indep. homog. noncomm.
 $SL(2, \mathbb{C})$ -invariants of degree n in 5 variables.
(hence LHS = Hilbert series of
 $\mathbb{C}\langle x_0, x_1, x_2, x_3, x_4 \rangle^{SL(2, \mathbb{C})}$)

$$2/ \frac{1}{2t} \left(1 - \sqrt{\frac{1-3t}{1+t}} \right) = 1+t^2+t^3+3t^4+6t^5 + \dots$$

$$= \sum_0^{\infty} \tilde{C}(2,n)t^n$$

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($\tilde{C}(2,n) = \#$ invariants ^{as above} of degree n in 3 variables)

%N Same as above in 2 variables

Reference: %R %O Same

G. Almkvist - W. Dicks - E. Formanek: Hilbert series
of fixed free algebras and noncommutative
invariant theory, J. Alg. 93 (1985), 189-214.

~~But 2 to enter with
make is then enter!~~