gfun[listtorec] - find a recurrence for the elements

gfun[seriestorec] - find a recurrence for the coefficients of a series

Calling Sequence

listtorec(l, u(n), <[typelist]>)

seriestorec(s, u(n), <[typelist]>)

Parameters

l - a list
s - a series
u(n) - the unknown function and its variable

[typelist] - (optional) a list of generating function types

Description

• The procedures listtorec and seriestorec compute a linear recurrence with polynomial coefficients satisfied by the expressions in l or s, with a normalization specified by typelist. For example, ordinary (ogf) or exponential (egf). For a full list of available choices see gftypes.

• If typelist contains more than one element, these types are tried in order.

• If typelist is not provided, the default optionsgf=['ogf','egf'] is used. The output is a list whose first element is a set containing the recurrence and its initial conditions, and whose second element is the type to which it corresponds.

• One should give as many terms as possible in the list l or the series s.

Examples

> with(gfun):
1:=[1, 1, 2, 5, 14, 42, 132, 429, 1430, 4862, 16796, 58786]:
rec:=listtorec(1,u(n));
rec := [ {(-4 n - 2) u(n) + (n + 2) u(n + 1), u(0) = 1}, ogf ]

> rsolve(op(1,rec),u(n));

\[
\frac{4^n \Gamma \left( n + \frac{1}{2} \right)}{\sqrt{\pi} \Gamma(n + 2)}
\]

> rec2:=seriestorec(series(add(1[i]*x^(i-1)*(i-1)!, i=1..nops(1)), x, 12), u(n), ['egf']);
rec2 := [ {(-4 n - 2) u(n) + (n + 2) u(n + 1), u(0) = 1}, egf ]
See Also
gfun, gfun[parameters]