gfun[listtoalgeq] - find an algebraic equation satisfied by a generating function

gfun[seriestoalgeq] - find an algebraic equation satisfied by a series

Calling Sequence

listtoalgeq (l, y(x), <[typelist]>)

seriestoalgeq (s, y(x), <[typelist]>)

Parameters

l          - list
s          - series
y, z        - name of the unknown function and the generic variable
[typelist]  - (optional) list of generating function types

Description

- The procedures listtoalgeq and seriestoalgeq compute a polynomial equation in y and x satisfied by
  the generating function y(x) of the expressions in l or s, this generating function being of one of the
types 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 the polynomial in y(x) and x that was found, and whose second element is the type to
  which it corresponds.
- In the current implementation, the maximal degree of y is 6 and the maximum degree of the
  coefficients is 3. This can be changed by modifying the variables gfun[maxdegeqn] and gfun
  [maxdegcoeff].
- If sufficiently many terms are given, and no solution is found, then generating function does not
  satisfy any algebraic equation of degree less or equal to gfun[maxdegeqn] with coefficients of
  degree less or equal to gfun[maxdegcoeff].

Examples

> with(gfun):
1:=[1, 1, 2, 5, 14, 42, 132, 429, 1430, 4862, 16796, 58786]:
listtoalgeq(1,y(x));

[-1 + y(x) - x y(x)^2, ogf]  (2.1)

> s:=series((1-sqrt(1-4*x)),x,9);

s := 2 x + 2 x^2 + 4 x^3 + 10 x^4 + 28 x^5 + 84 x^6 + 264 x^7 + 858 x^8 + O(x^9)  (2.2)

> seriestoalgeq(s,y(x));
\[4x - 2y + y(x)^2, \text{ogf}\]  \hspace{1cm} (2.3)

See Also

gfun, gfun[parameters]