gfun[listtoratpoly] - find a rational generating function

gfun[seriestoratpoly] - find a rational approximant

Calling Sequence

listtoratpoly(l, x, <[typelist]>)
seriestoratpoly(s, <[typelist]>)

Parameters

l          - a list
s          - a series
x          - the unknown variable
[typelist] - (optional) a list of generating function types

Description

- The procedures listtoratpoly and seriestoratpoly compute a rational function in \( x \) for the generating function 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).
- These functions are frontends to convert[ratpoly] which performs the actual computation.
- If typelist contains more than one element, these types are tried in order. If typelist is not provided, a default optionsgf=['ogf','egf'] is used.
- The output is a list whose second element is the type for which a solution was found, and whose first element is the rational function.
- One should give as many terms as possible in the list \( l \) or the series \( s \).

Examples

If the input is the first few elements of the Fibonacci sequence, the the output is the generating series for the Fibonacci numbers.

\[
\begin{align*}
\text{> with(gfun):} & \quad \text{1:=[1,1,2,3,5,8,13];} \\
& \quad l := [1, 1, 2, 3, 5, 8, 13] \quad (2.1) \\
\text{> listtoratpoly(l,x);} & \quad \left[ \frac{-1}{-1 + x + x^2}, \text{ogf} \right] \quad (2.2) \\
\text{> seriestoratpoly(series(1+x+2*x^2*2!+3*x^3*3!+5*x^4*4!+8*x^5*5!+13*x^6*6!,x,8),[\{}\text{'egf'}\}]};
\end{align*}
\]
$$\left[ -\frac{1}{-1 + x + x^2}, \text{egf} \right]$$ (2.3)

See Also

gfun, gfun[parameters], convert[ratpoly]