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**.f or 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):
  l:=[1, 1, 2, 5, 14, 42, 132, 429, 1430, 4862, 16796, 58786]:
  rec:=listtorec(l,u(n));
```

$$rec := [\{(-4n-2)\,u(n) + (n+2)\,u(n+1), u(0)=1\}, ogf] \tag{2.1}$$

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

$$\frac{4^n\,\Gamma\left(n+\frac{1}{2}\right)}{\sqrt{\pi}\,\Gamma(n+2)} \tag{2.2}$$

```
> rec2:=seriestorec(series(add(l[i]*x^(i-1)*(i-1)!, i=1..nops(l)),
  x, 12), u(n), ['egf']);
```

$$rec2 := [\{(-4n-2)\,u(n) + (n+2)\,u(n+1), u(0)=1\}, egf] \tag{2.3}$$

See Also

gfun, gfun[parameters]