gfun[algfuntoalgeq] - find a polynomial equation satisfied by an algebraic function

Calling Sequence

algfuntoalgeq(**expr**, **y(z)**, **ini**, **typ**)

Parameters

`expr` - algebraic or radical function in **z**

`y` - name of the holonomic function

`z` - name of the generic variable associated with **y**

`ini` - (optional) initial conditions to specify a solution of the resulting polynomial equation

`typ` - (optional) the type of coefficients to use in the polynomial equation. Must be either the string 'rational' or 'algebraic'. The default is 'rational'.

Description

This function returns a polynomial in **y** and **z** that has **expr** as a root. The polynomial is not necessarily minimal.

When the parameter **ini** is used, it will be assigned a set of initial conditions for the polynomial to specify which branch is meant, when possible.

When the parameter **typ** is 'rational', the coefficients of the polynomial will be of type rational and/or type name. This is particularly useful for finding a polynomial for an algebraic number. When the **typ** is 'algebraic' the coefficients will be algebraic numbers. This option can be used with algebricsubs .

Examples

```
> with(gfun):
```

```
> f:=(1-sqrt(1-4*z))/2/z; algfuntoalgeq(f,y(z),'ini'); ini;
```

$$\frac{1}{2}\ \frac{1-\sqrt{1-4z}}{z} \tag{2.1}$$

$$1+y^2 z-y$$

$$\{y(0)=1, D(y)(0)=1, D^{(2)}(y)(0)=4\}$$

```
> f:=a*RootOf(_Z^5+1)*x^(2/3); algfuntoalgeq(f,y(x)); algfuntoalgeq
  (f,y(x),'algebraic');
```

$$a\ RootOf\left(\_Z^5+1\right) x^{2/3} \tag{2.2}$$

$$y^{15}+a^{15}x^{10}$$

$$a^3\ RootOf\left(\_Z^5+1\right)^3 x^2-y^3$$

```
> algfuntoalgeq(5^(1/3)+3*7^(2/3),y(x));
```

$$y^9-3984\,y^6+5112147\,y^3-2342039552 \tag{2.3}$$

See Also

gfun, gfun[parameters], gfun[algebraicsubs]