

## filter\_z2.gce

### Attributes

```
mainvars: x y
stparams:
+   x_sv=0 x1_sv=0
+   y_sv=0
iparms: flag_asympt=0
rparams:
+   a0=1 a1=1 a2=1
+   f0=0.15915
```

### Description

`filter_z2.gce` satisfies the  $s$ -domain relationship,

$$y(s) = (a_0 + a_1 s + a_2 s^2) x(s).$$

`f0` specifies the frequency value to be used for scaling of the filter coefficients, the default value being  $1/2\pi$  Hz. The start-up parameters `x_sv`, `x1_sv`, and `y_sv`, provide the starting values for  $x$ ,  $dx/dt$ , and  $y$ , respectively, in start-up simulation.

Note that there are two options for assigning the filter coefficients:

- (a) Enter coefficients for  $\omega_c = 1$  rad/s and then enter the actual (desired)  $f_c$  in Hz.
- (b) Enter coefficients as required for the desired  $f_c$  but leave the default value of `f0` unchanged.

In the first case, the coefficients will be changed internally; in the second case, they will be taken as assigned by the user.

In AC analysis, the above equation holds (with  $s = j\omega$ ). The integer parameter `flag_asympt` is useful for plotting the Bode approximations (magnitude and phase) of a transfer function. When this flag is set to 1, the Bode approximation is used; if it is 0, normal (i.e., exact) computation of  $y(s)$  is carried out.