

# picntrl.gce

## Attributes

```
mainvars: x y  
auxvars: y1 y2 y3  
stparams: y2_sv=0  
rparams: kp=1 ki=0
```

## Description

This element is used for “PIC control”. The real parameters **kp** and **ki** provide  $K_P$  and  $K_I$ , respectively. The general variables **x** and **y** are related as follows:

$$\begin{aligned}y_1 &= K_P x , \\y_2 &= \int x dt , \\y_3 &= K_I y_2 , \\y &= y_1 + y_3 = K_P x + K_I \int x dt .\end{aligned}$$

The start-up parameter **y2\_sv** provides the starting value for **y2** in start-up simulation.

In AC analysis, **x**, **y**, **y1**, **y2**, **y3** are complex numbers which satisfy the small-signal equations corresponding to the above equations.