cmpr_1_1.xbe

Attributes

```
xbe name=cmpr_1_1 evaluate=yes limit_tstep=yes save_history=yes
# if x > x0, y = high, else low
# (reverse if flag_inverting=1)
Jacobian: variable
input_vars: x
output_vars: y
aux_vars:
iparms:
+   flag_invert=0
+   flag_quad=0
sparms:
rparms:
+   x0=0
+   y_low=0
+   y_high=1
+   x_1=0
+   x_2=0
+   t_1=0
+   t_2=0
+   epsl=1.0e-6
+   delt_min=1.0e-6
+   delt_nrml=0.001
stparms:
igparms:
outparms: x y
```

Description

cmpr_1_1.xbe is a comparator with the following behaviour.

(a) flag_invert = 0:
   y = y_high   if x > x0,
     = y_low   if x < x0.

(b) flag_invert = 1:
   y = y_high   if x < x0,
     = y_low   if x > x0.

The parameters delt_min, delt_nrml, and epsl are used for controlling the simulator time steps. Additional time points are forced, depending on the values of delt_min and delt_nrml, when $|x - x_0| < \epsilon$. This feature allows accurate simulation without having to make the average time step very small. Generally, delt_nrml should be made equal to the typical simulator time step while delt_min should be made much smaller (say, by a factor of 100).

flag_quad decides the type of interpolation used to estimate the cross-over time (when x changes sign). If flag_quad is 0, linear interpolation is used; if it is 1, quadratic intepolation is used. For more details, see Ref. [1].

References

1. M.B. Patil, R.D. Korgaonkar, K. Appaiah, "GSEIM: A General-purpose Simulator with Explicit and Implicit Methods," submitted to Sādhanā, also available at https://arxiv.org/abs/2104.06621