cmpr_2_2.xbe

Attributes

```
xbe name=cmpr_2_2 evaluate=yes limit_tstep=yes save_history=yes
# if x1 > x2, y1 = high, else low
# (reverse if flag_inverting=1)
# y2 = not(y1)
Jacobian: variable
input_vars: x1 x2
output_vars: y1 y2
aux_vars:
iparms:
+  flag_invert=0
+  flag_quad=0
sparms:
rparms:
+  y_low=0
+  y_high=1
+  x1_1=0
+  x1_2=0
+  x2_1=0
+  x2_2=0
+  t_1=0
+  t_2=0
+  epsl=1.0e-6
+  delt_min=1.0e-6
+  delt_nrml=0.001
stparms:
igparms:
outparms: x1 x2 y1 y2
```

Description

cmpr_2_2.xbe is a comparator with the following behaviour.

(a) flag_invert = 0:

    y1 = y_high   if x1 > x2,

       = y_low   if x1 < x2.

(b) flag_invert = 1:

    y1 = y_high   if x1 < x2,

       = y_low   if x1 > x2.

The other output y2 is the complement of y1.

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 x1 and x2 are within epsl of each other. 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 $x_1 - x_2$ 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