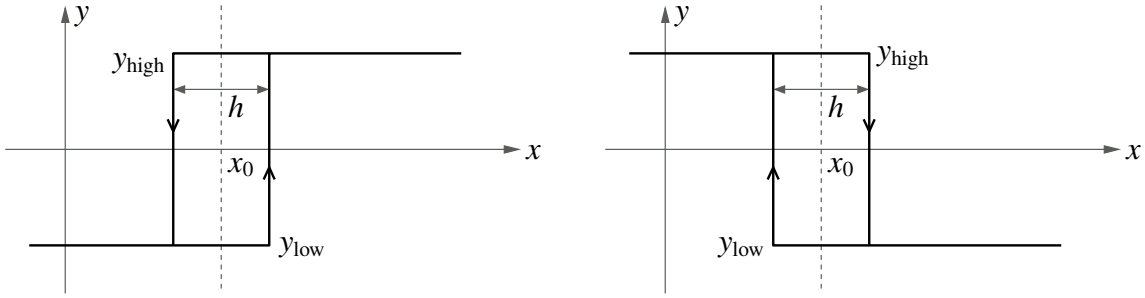
cmprh_1_1.xbe

Attributes

```
xbe name=cmprh_1_1 evaluate=yes limit_tstep=yes save_history=yes
# if x > x0 +/- h/2, y = high, else low
# (reverse if flag_inverting=1)
# h is the hysterisis band, centred around x0
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
+  h=0.1
+  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
+  hby2=0
+  y_old=0
+  y_half=0
stparms:
igparms:
outparms: x y
```

Description

cmprh_1_1.xbe is a comparator with hysterisis. Its input-output relationship is shown below.



flag_invert = 0 flag_invert = 1

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 is within ϵ of the threshold point ($x_0 + h/2$ or $x_0 - h/2$). 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. 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`