clock_thyr.xbe

Attributes

```
xbe name=clock_thyr evaluate=yes limit_tstep=yes
Jacobian: constant
input_vars:
output_vars: y
aux_vars:
iparms:
+   flag_frequency=0
+   flag_period=1
+   flag_tw_degrees=0
sparms:
rparms:
+   x_low=0
+   x_high=1.0
+   frequency=0
+   T=1m
+   tw_deg=10
+   tw=10u
+   alpha=0
+   beta=0
+   dt=0.1u
+   T1=1
+   T2=1
+   t0=0
+   dt1=0.01
+   dt2=0.01
+   L0=0
+   L1=0
+   L2=0
+   tk1=0
+   tk2=0
+   tk3=0
+   tk4=0
+   tk5=0
+   slope1=0
+   slope2=0
+   epsl=0
stparms:
igparms:
outparms: y
```

Description

clock_thyr.xbe is useful for generating gate signals in thyristor circuits. It is a square wave source with y as its output. Its behaviour is controlled by integer parameters flag_frequency, flag_period, flag_tw_degrees, and real parameters frequency, T, x_low, x_high, tw, tw_deg, alpha, beta, dt. Each period of $y(t)$ has two intervals, T1 and T2. $y(t)$ is equal to x_high in the first (T1) interval, and x_low in the second (T2) interval. The parameters have the following meaning:

frequency: Clock frequency. This parameter applies if flag_frequency is 1.

T: Clock period. This parameter applies if flag_period is 1.

tw: Pulse width in seconds. This parameter applies if flag_tw_degrees is 0.

tw_deg: Pulse width in degrees (with 360° corresponding to one period). This parameter applies if `flag_tw_degrees` is 1.

alpha, beta: `alpha` and `beta` are used to compute an "offset" time interval given by $t_0 = \dfrac{\alpha + \beta}{360} T$, where T is the period.

dt: Width of the transition from the `T1` to `T2` phase and *vice versa*. `dt` should be small as compared to the pulse width T_w (say, 10% of T_w or smaller).

y is made available as an output variable. $y(t)$ is shown in the following figures for different values of `alpha` and `beta`.
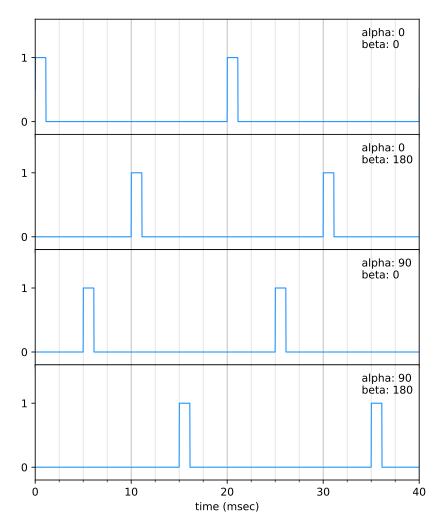

Figure 1: $y(t)$ obtained with `flag_frequency = 1`, `flag_period = 0`, `flag_tw_degrees = 1`, `frequency = 50`, `x_low = 0`, `x_high = 1`, `tw_deg = 20`, `dt = 0.01m`, and different values of `alpha` and `beta`.