

## clock.gce

### Attributes

```
mainvars: y  
iparms: i0=0  
rparms: t1=1 t2=2 t0=0 g_high=1 dt1=0.01 dt2=0.01
```

### Description

`clock.gce` is a square wave source with the general variable `y` as its output. The parameters have the following meaning:

**t1:** The first part of one period. `y` is equal to 0 in this interval if `i0=0` and `g_high` if `i0=1`.

**t2:** The second part of one period.

**t0:** An “offset” time interval. Its meaning will become clear in the following example.

**dt1:** Width of the transition at the beginning of the `t1` phase.

**dt2:** Width of the transition at the beginning of the `t2` phase.

Note that the transition width is included in `t1` or `t2`. For example, if `t1=10`, `dt1=1.5`, and `i0=1`, then the `t1` phase consists of a rising edge for 1.5 s and an interval of 8.5 s with a constant level equal to `g_high`.

AC behaviour is not implemented.

The effect of the various parameters of `clock.gce` on the waveforms is shown in Fig. 1. The corresponding circuit file is given below.

```

title: testing of clock.gce

begin_circuit
    gelement type=clock y=y1 g_high=1
+    t1=10 t2=20 dt1=1 dt2=1 i0=0 t0=0
    gelement type=clock y=y2 g_high=1
+    t1=10 t2=20 dt1=2 dt2=4 i0=1 t0=0
    gelement type=clock y=y3 g_high=1
+    t1=10 t2=20 dt1=0.1 dt2=0.1 i0=0 t0=15
    outvar:
+    y1=var_of_y1
+    y2=var_of_y2
+    y3=var_of_y3
end_circuit

begin_solve
    solve_type=dc
    initial_sol initialize
end_solve

begin_solve
    solve_type=trns
    initial_sol previous
    begin_output
        filename=clock_gce.dat
        variables: y1 y2 y3
    end_output
    method: back_euler=yes
+    t_start=0 t_end=100 delt_const=1
end_solve

end_cf

```

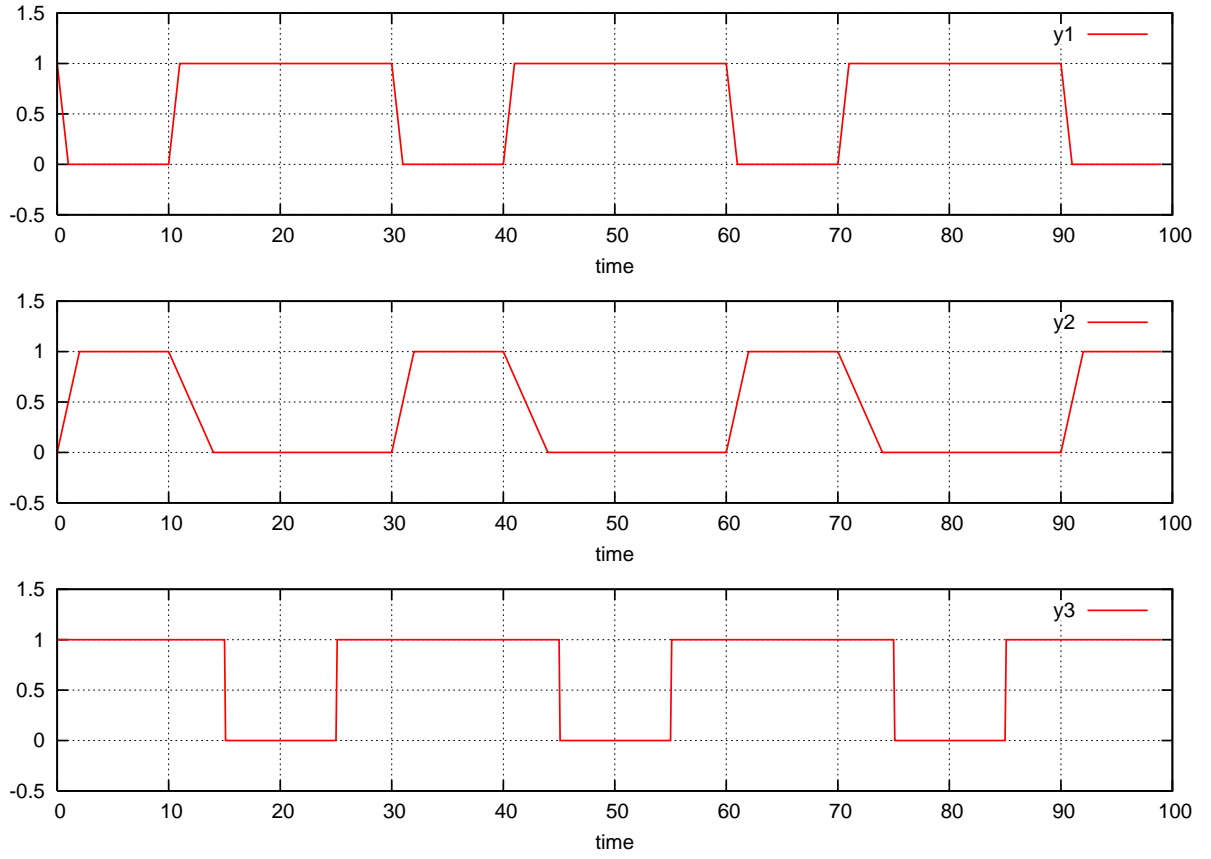


Figure 1: Waveforms obtained with `clock.gce`: (a) `g_high=1`, `t1=10`, `t2=20`, `dt1=1`, `dt2=1`, `i0=0`, `t0=0`, (b) `g_high=1`, `t1=10`, `t2=20`, `dt1=2`, `dt2=4`, `i0=1`, `t0=0`, (c) `g_high=1`, `t1=10`, `t2=20`, `dt1=0.1`, `dt2=0.1`, `i0=0`, `t0=15`.