

## clock6\_a.gce

### Attributes

```
mainvars: y1 y2 y3 y4 y5 y6
iparms: i0=0
rparms: t1=1 t2=2 alpha=0 g_high=1 dt1=0.01 dt2=0.01
```

### Description

`clock6_a.gce` generates a set of six clock signals `y1`, `y2`, `y3`, `y4`, `y5`, `y6`. The six signals are related in a specific manner. `y2` has a phase shift of  $60^\circ$  with respect to `y1`, and so on. The parameters have the following meaning:

**t1:** The first part of one period. The value of the each of the six outputs is `g_high` in this interval.

**t2:** The second part of one period. The value of the each of the six outputs is 0 in this interval.

**g\_high:** The amplitude of each of the six signals. The signals vary from 0 to `g_high`.

**dt1:** Width of the rising edges.

**dt2:** Width of the falling edges.

**alpha:** An “offset” angle (in degrees) with respect to  $t = 0$ . Each of the six waveforms get shifted by the corresponding time interval. (One period corresponds to  $360^\circ$ .)

Note that the rising and falling edge widths are included in `t1` and `t2`.

AC behaviour is not implemented.

The effect of the various parameters of `clock6_a.gce` on the waveforms is shown in Figs. 1 and 2. The corresponding circuit file (available as `clock6_a_gce.in` in the examples directory) is reproduced below.

```

title: testing of clock6_a.gce

begin_circuit
    gelement type=clock6_a
+   y1=y1 y2=y2 y3=y3 y4=y4 y5=y5 y6=y6
+   g_high=1 t1=0.4 t2=0.6 dt1=0.002 dt2=0.002
+   alpha=0
    gelement type=clock6_a
+   y1=y7 y2=y8 y3=y9 y4=y10 y5=y11 y6=y12
+   g_high=1 t1=0.4 t2=0.6 dt1=0.002 dt2=0.002
+   alpha=90
    outvar:
+   y1=var_of_y1   y2=var_of_y2
+   y3=var_of_y3   y4=var_of_y4
+   y5=var_of_y5   y6=var_of_y6
+   y7=var_of_y7   y8=var_of_y8
+   y9=var_of_y9   y10=var_of_y10
+   y11=var_of_y11 y12=var_of_y12
end_circuit

begin_solve
    solve_type=dc
    initial_sol initialize
end_solve

begin_solve
    solve_type=trns
    initial_sol previous
    begin_output
        filename=clock6_a_gce_1.dat
        variables: y1 y2 y3 y4 y5 y6
    end_output
    begin_output
        filename=clock6_a_gce_2.dat
        variables: y7 y8 y9 y10 y11 y12
    end_output
    method: back_euler=yes
+   t_start=0 t_end=3.0 deltt_const=0.1
+   deltt_min=0.001
end_solve

end_cf

```

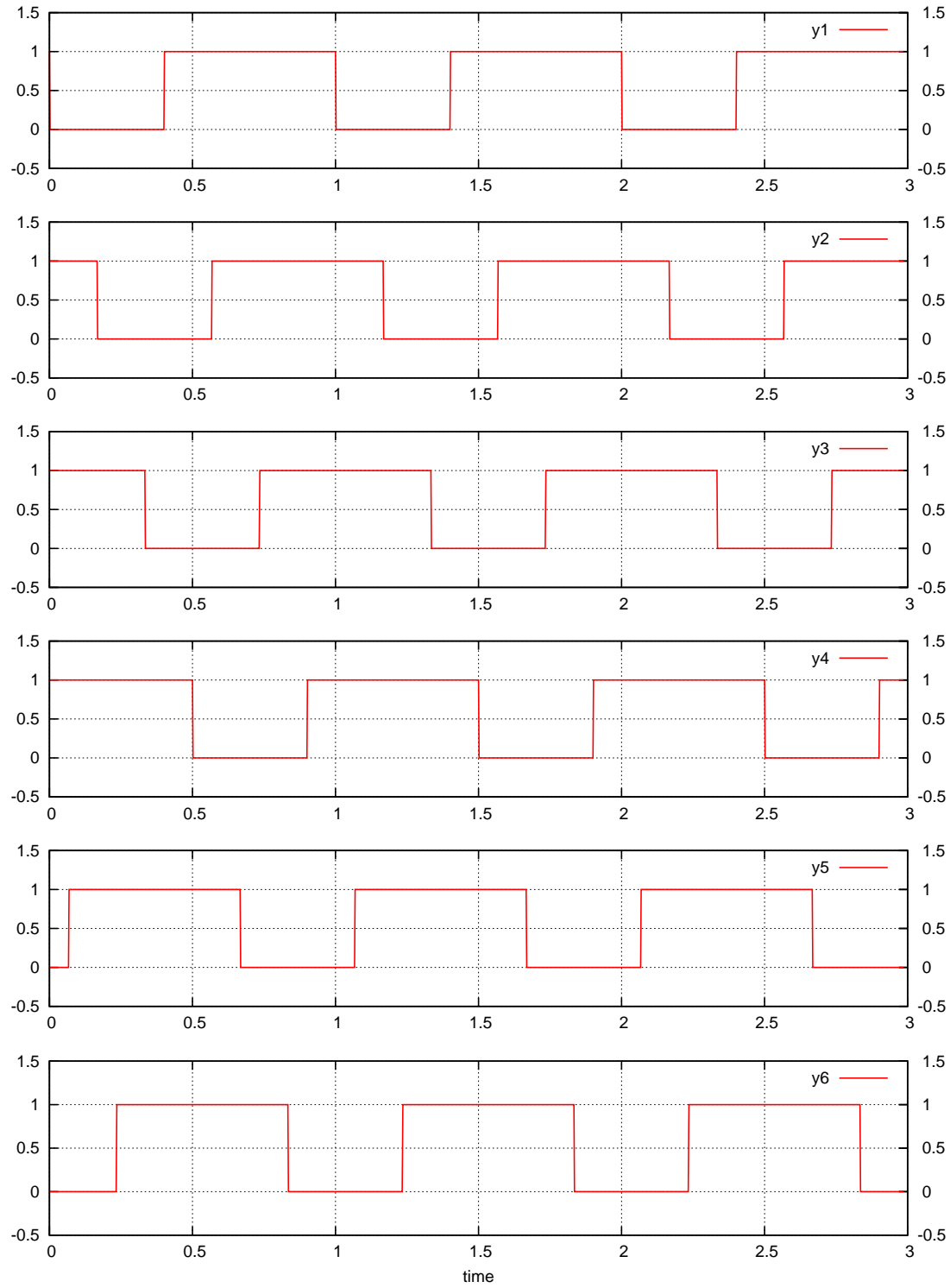


Figure 1: Waveforms obtained with `clock6_a.gce` with `g_high=1`, `t1=0.4`, `t2=0.6`, `dt1=0.002`, `dt2=0.002`, `alpha=0`,

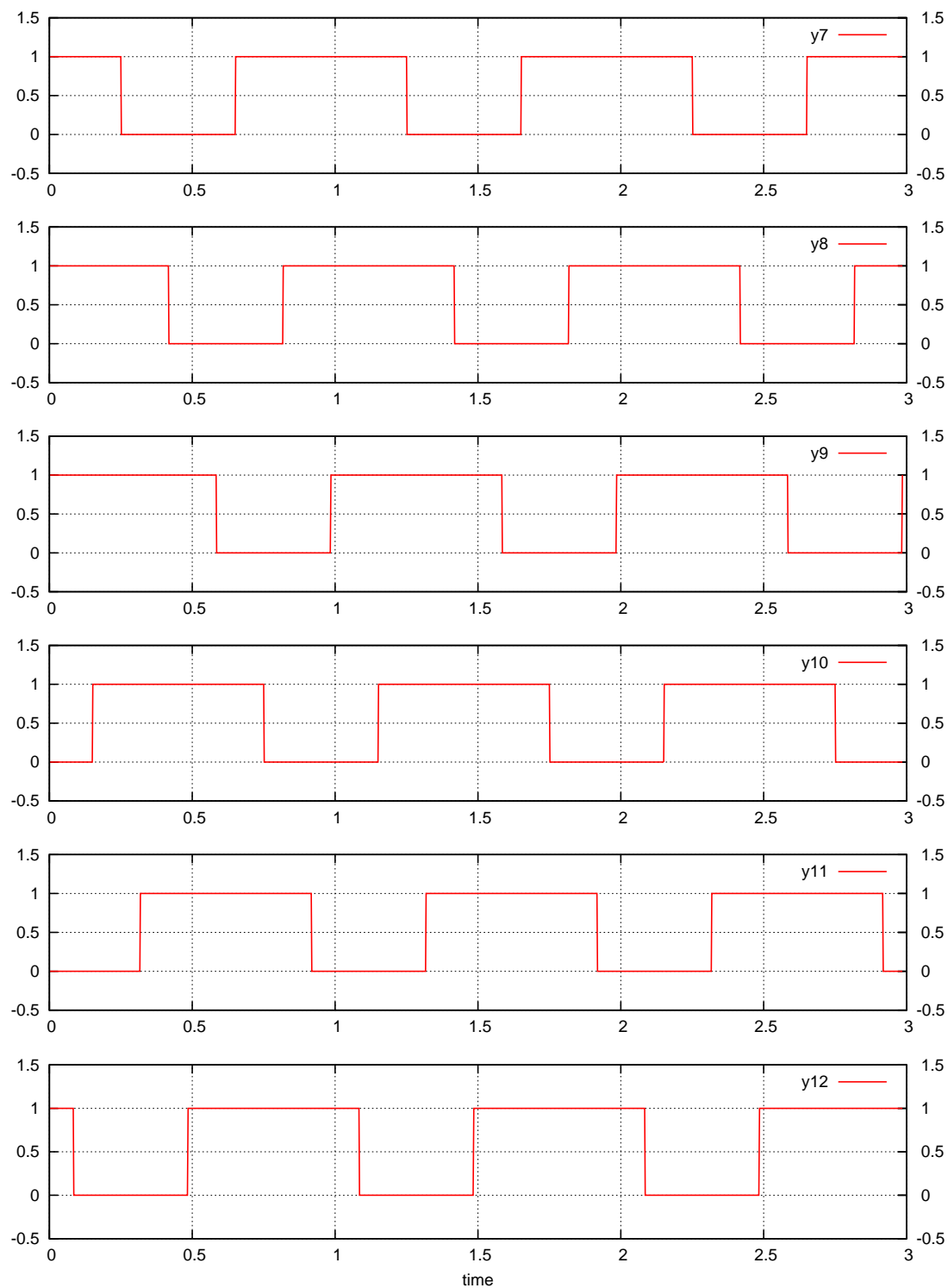


Figure 2: Waveforms obtained with `clock6_a.gce` with `g_high=1`, `t1=0.4`, `t2=0.6`, `dt1=0.002`, `dt2=0.002`, `alpha=90`.