

triangle_1.ece

Attributes

```
mainnodes: p n
outvar: i1=brc_of_v0 v1=brv_of_v0
iparms: i0=0
rparms:
+   t1=1 t2=1 t0=0 v_high=1.0 v_low=-1.0
+   eps1=1.0e-9
```

Description

`triangle_1.ece` is a triangular wave voltage source connected between nodes `p` and `n`. The parameters have the following meaning:

`t1`: The first part of one period. The voltage goes from `v_high` to `v_low` in this interval if `i0=0` (and from `v_low` to `v_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.

`eps1`: Used in time step control. `eps1` can generally be set to be $0.001 \times \min(t1, t2)$.

The output variables `i1` and `v1` are the branch current and branch voltage, respectively.

AC behaviour is not implemented.

The effect of the various parameters of `triangle_1.ece` on the waveforms is shown in Fig. 1. The corresponding circuit file (available as `triangle_1_ece.in` in the examples directory) is reproduced below.

```

title: testing of triangle_1.ece

begin_circuit

    eelement type=triangle_1 p=a n=0 t1=2 t2=3 t0=0 i0=0
+   v_high=2 v_low=-2 epsl=1e-3

    eelement type=triangle_1 p=b n=0 t1=2 t2=3 t0=0 i0=1
+   v_high=2 v_low=-2 epsl=1e-3

    eelement type=triangle_1 p=c n=0 t1=2 t2=3 t0=1.5 i0=0
+   v_high=2 v_low=-2 epsl=1e-3

    eelement type=r p=a n=b r=1
    eelement type=r p=b n=c r=1

    refnode=0
    outvar:
+   va=nodev_of_a
+   vb=nodev_of_b
+   vc=nodev_of_c
end_circuit

begin_solve
    solve_type=startup
    initial_sol initialize
end_solve

begin_solve
    solve_type=trns
    initial_sol previous
    begin_output
        filename=triangle_1_ece.dat
        variables: va vb vc
    end_output
    method:
+   back_euler=yes
+   t_start=0 t_end=15 delt_const=0.5 delt_min=0.1
end_solve

end_cf

```

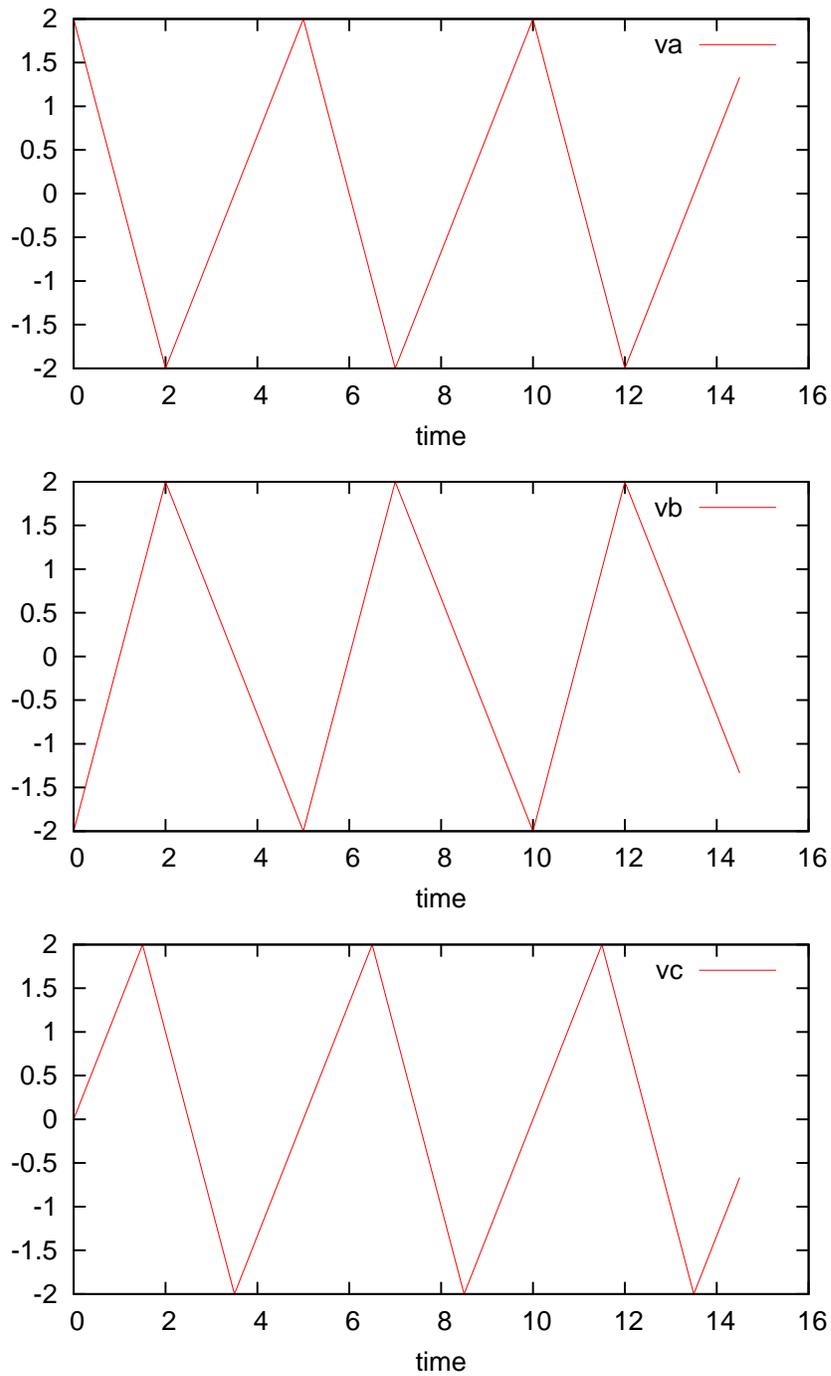


Figure 1: Waveforms obtained with `triangle_1.ece`: (a) `va`: $t_1=2$, $t_2=3$, $t_0=0$, $i_0=0$, $v_{high}=2$, $v_{low}=-2$, (b) `vb`: $t_1=2$, $t_2=3$, $t_0=0$, $i_0=1$, $v_{high}=2$, $v_{low}=-2$, (c) `vc`: $t_1=2$, $t_2=3$, $t_0=1.5$, $i_0=0$, $v_{high}=2$, $v_{low}=-2$.