

triangle\_1.ece



### Attributes

```
mainnodes: p n
outvar:
+ v1=v1_of_v0
+ i1=cur(p)_of_v0
iparms:
+ i0=0
rparms:
+ t1=1
+ t2=1
+ t0=0
+ v_high=1.0
+ v_low=-1.0
```

### 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.

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 is given 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

```

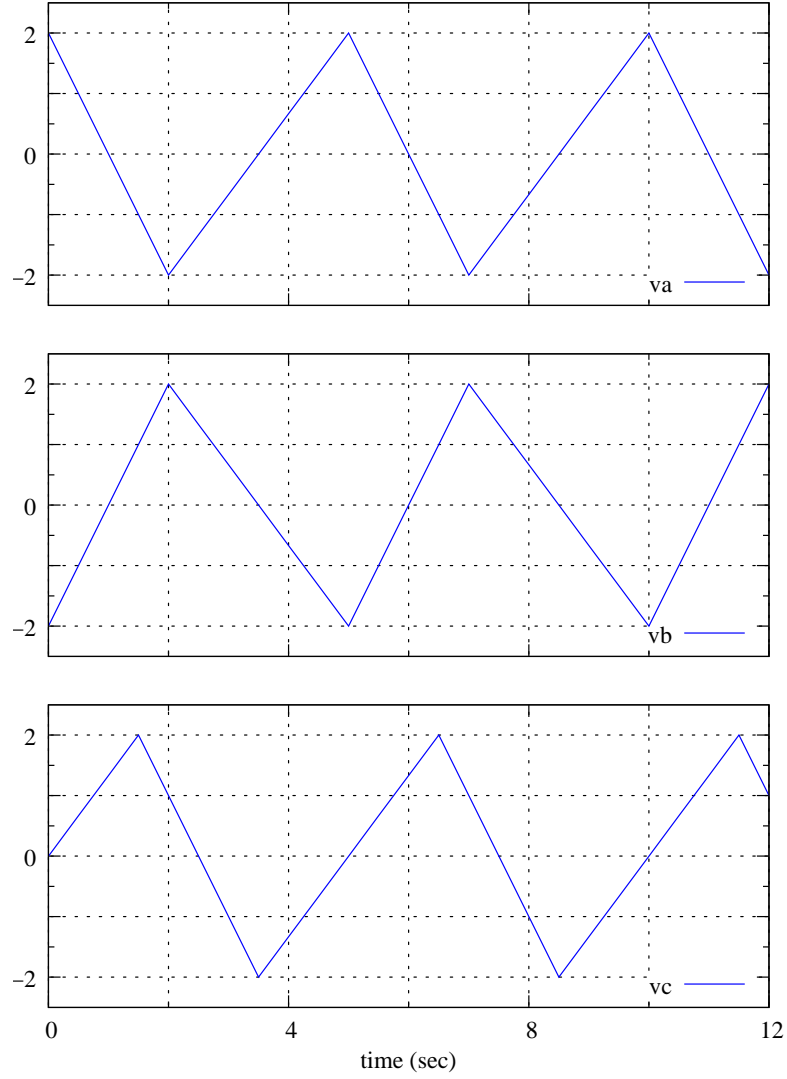


Figure 1: Waveforms obtained with `triangle_1.ece`: (a) `va`:  $t_1=2$ ,  $t_2=3$ ,  $t_0=0$ ,  $i_0=0$ ,  $v_{high}=2$ ,  $v_{low}=-2$ , (b) `vb`:  $t_1=2$ ,  $t_2=3$ ,  $t_0=0$ ,  $i_0=1$ ,  $v_{high}=2$ ,  $v_{low}=-2$ , (c) `vc`:  $t_1=2$ ,  $t_2=3$ ,  $t_0=1.5$ ,  $i_0=0$ ,  $v_{high}=2$ ,  $v_{low}=-2$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