

## cmptr\_2.ece

### Attributes

```

mainnodes: p n
ind_nodes: node_x1 node_x2
rparms:
+   v_high=1.0 v_low=0
+   epsl=1.0e-6 delta_tmin=1.0e-6 delta_tnrml=1m

```

### Description

`cmptr_2.ece` is a comparator which compares the voltages at nodes `node_x1` and `node_x2`. The output voltage appears between nodes `p` and `n`; its value is `v_high` if  $v(\text{node\_x1}) > v(\text{node\_x2})$ ; else, it is `v_low`.

The parameters `delta_tmin`, `delta_tnrml`, and `epsl` are used for controlling the simulator time steps. Additional time points are forced, depending on the values of `delta_tmin` and `delta_tnrml`, when  $v(\text{node\_x1})$  and  $v(\text{node\_x2})$  are within `epsl` of each other. This feature allows accurate simulation without having to make the average time step very small. Generally, `delta_tnrml` should be made equal to the typical simulator time step (`delt_const`) while `delta_tmin` should be made much smaller (say, by a factor of 100).

AC behaviour is not implemented.

Fig. 1 shows typical waveforms obtained with `cmptr_2.ece`. The corresponding circuit file (available as `cmptr_2_ece.in` in the examples directory) is reproduced below.

```

title: testing of cmptr_2

begin_circuit
    eelement type=triangle_2 p=a n=0 i0=0 tperiod=8m t0=0
+    v_high=1 v_low=-1 epsl=1u

    eelement type=triangle_2 p=b n=0 i0=1 tperiod=8m t0=0
+    v_high=1 v_low=-1 epsl=1u

    eelement type=cmptr_2 node_x1=a node_x2=b
+    p=c n=0 v_high=1.2 epsl=1.0e-6
+    delta_tmin=0.20u delta_tnrml=1.00m
    eelement type=r p=c n=0 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
    method: t_startup=0
end_solve

begin_solve
    solve_type=trns
    initial_sol previous
    begin_output
        filename=cmptr_2_ece.dat limit_lines=10000
        variables: va vb vc
    end_output
    method: itmax_trns=10000
+    back_euler=yes
+    t_start=0 t_end=20m delt_const=0.80m delt_min=0.1u
end_solve

end_cf

```

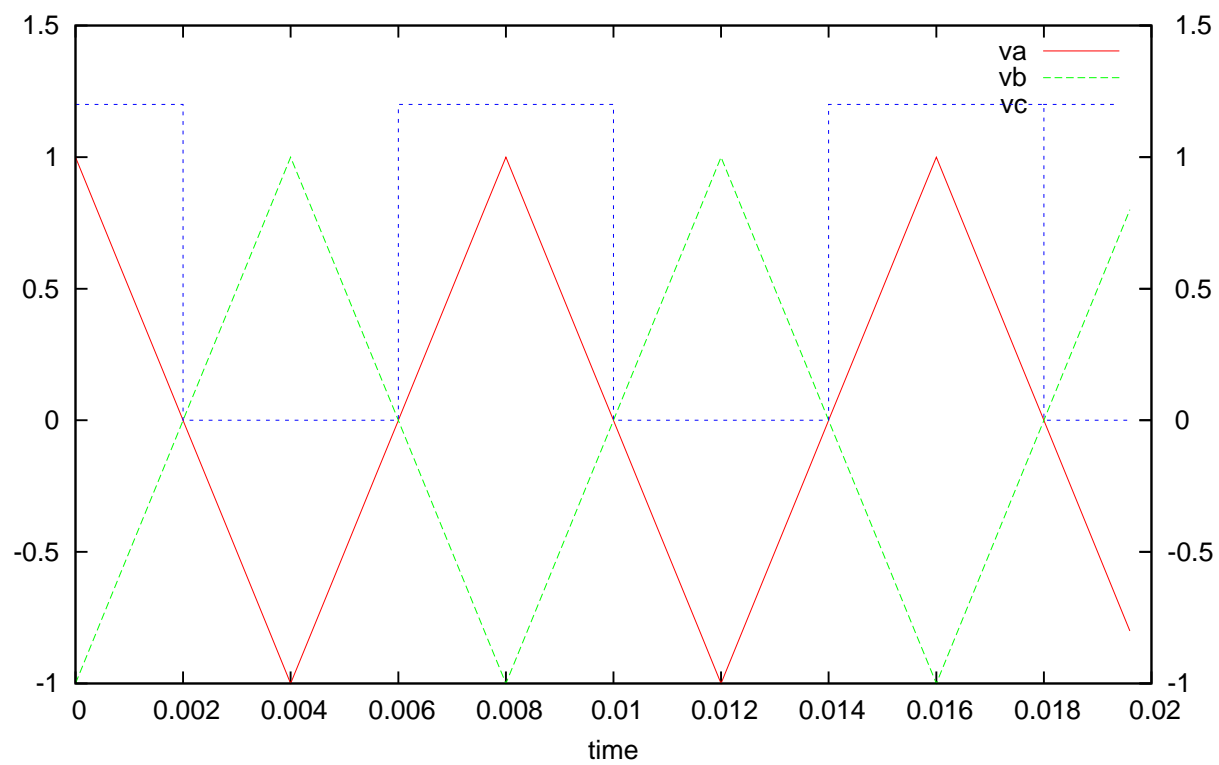


Figure 1: Waveforms obtained with `cmprtr_2.ece` (see the circuit file for details).