Exponential voltage source vexp

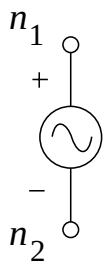

Figure 1: Independent Voltage Source Element.

Form:
`vexp:`⟨`instance name`⟩ n_1 n_2 ⟨`parameter list`⟩
n_1 is the positive element node,

n_2 is the negative element node.
Parameters:

Parameter	Type	Default value	Required?
v1: Initial value (A)	DOUBLE	0	no
v2: Final voltage (A)	DOUBLE	0	no
tdr: Rise Time delay (s)	DOUBLE	0	no
tdf: Fall Time delay (s)	DOUBLE	0	no
tcr: Rise Time Constant (s)	DOUBLE	0	no
tcf: Fall Time Constant (s)	DOUBLE	0	no

Example:
```
vexp:vsignal 8 0 v1=0.1 v2=0.8 tdr=1 tdf=2 tcr=0.35 tcf=1
```

Description:
The exponential transient is a single-shot event specifying two exponentials. The voltage is v_1 for the first t_{dr} seconds at which it begins increasing exponentially towards v_2 with a time constant of t_{cr} seconds. At time t_{df} the voltage exponentially decays towards v_1 with a time constant of t_{cf}. That is, The waveform shape of an exponential voltage source is given by

$$v_1 \qquad 0 < t \leq t_{d1} \tag{1}$$

$$v_1 + (v_2 - v_1)[1 - e^{-(t-t_{dr})/t_{cr}}] \qquad t_{d1} < t \leq t_{d2} \tag{2}$$

$$v_1 + (v_2 - v_1)[1 - e^{-(t_{df}-t_{dr})/t_{cr}}]e^{-(t-t_{df})/t_{cf}} \qquad t_{d2} < t \leq t_{stop} \tag{3}$$

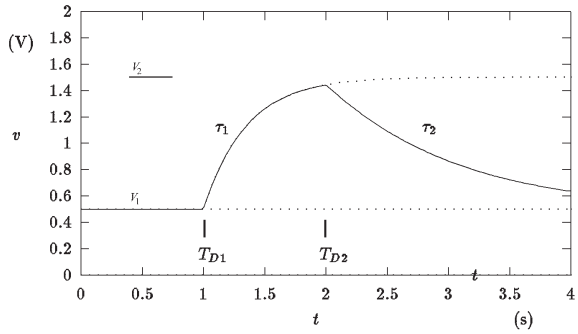

Figure 2: Voltage source transient exponential waveform for `vexp:vsignal 8 0 v1=0.1 v2=0.8 tdr=1 tdf=2 tcr=0.35 tcf=1`

Notes:
This is the `V` element in the SPICE compatible netlist.

Version:
2002.05.15

Credits:

Name	Affiliation	Date	Links
Satish Uppathil svuppath@eos.ncsu.edu	NC State University	May 2002	NC STATE UNIVERSITY www.ncsu.edu