

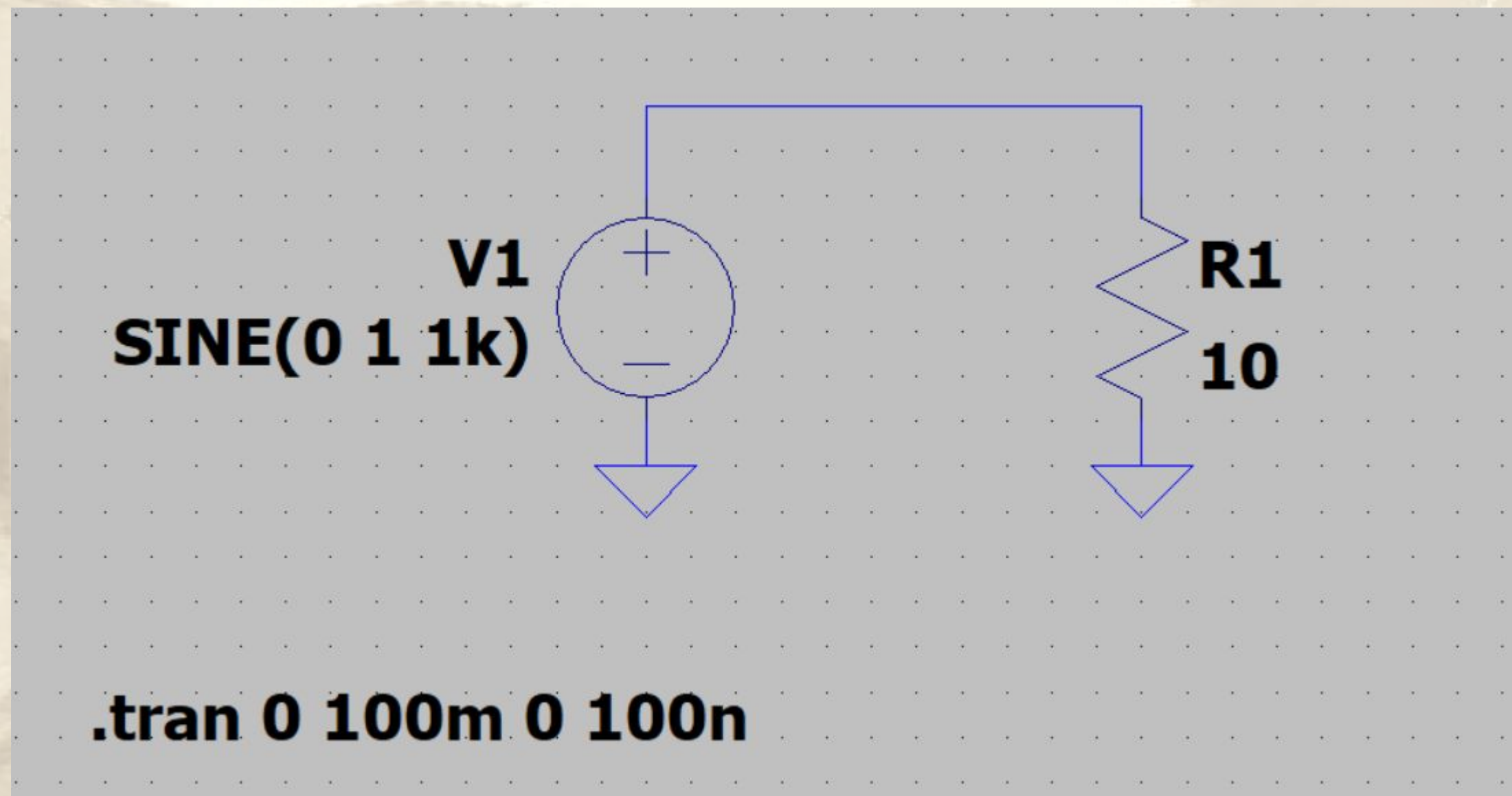
# Drops of LTSpice



Using arbitrary current  
sources as Loads



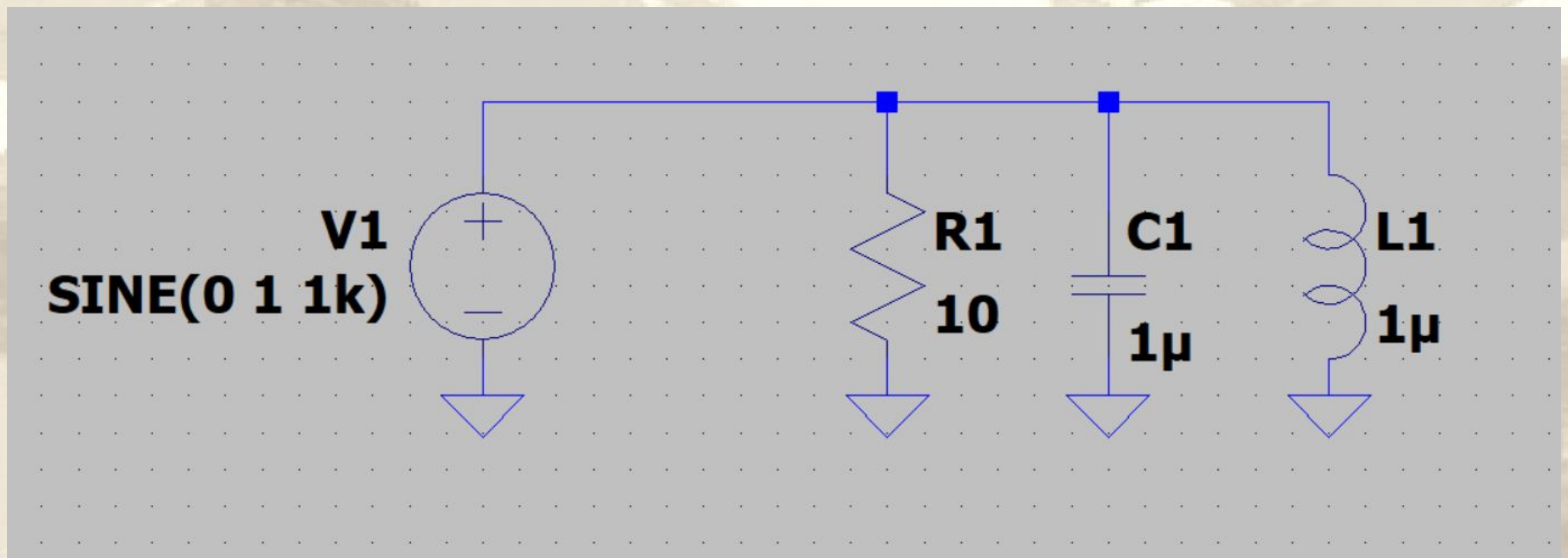
Everyone has done something like this...



It is a voltage source and a load. It could not be simpler.



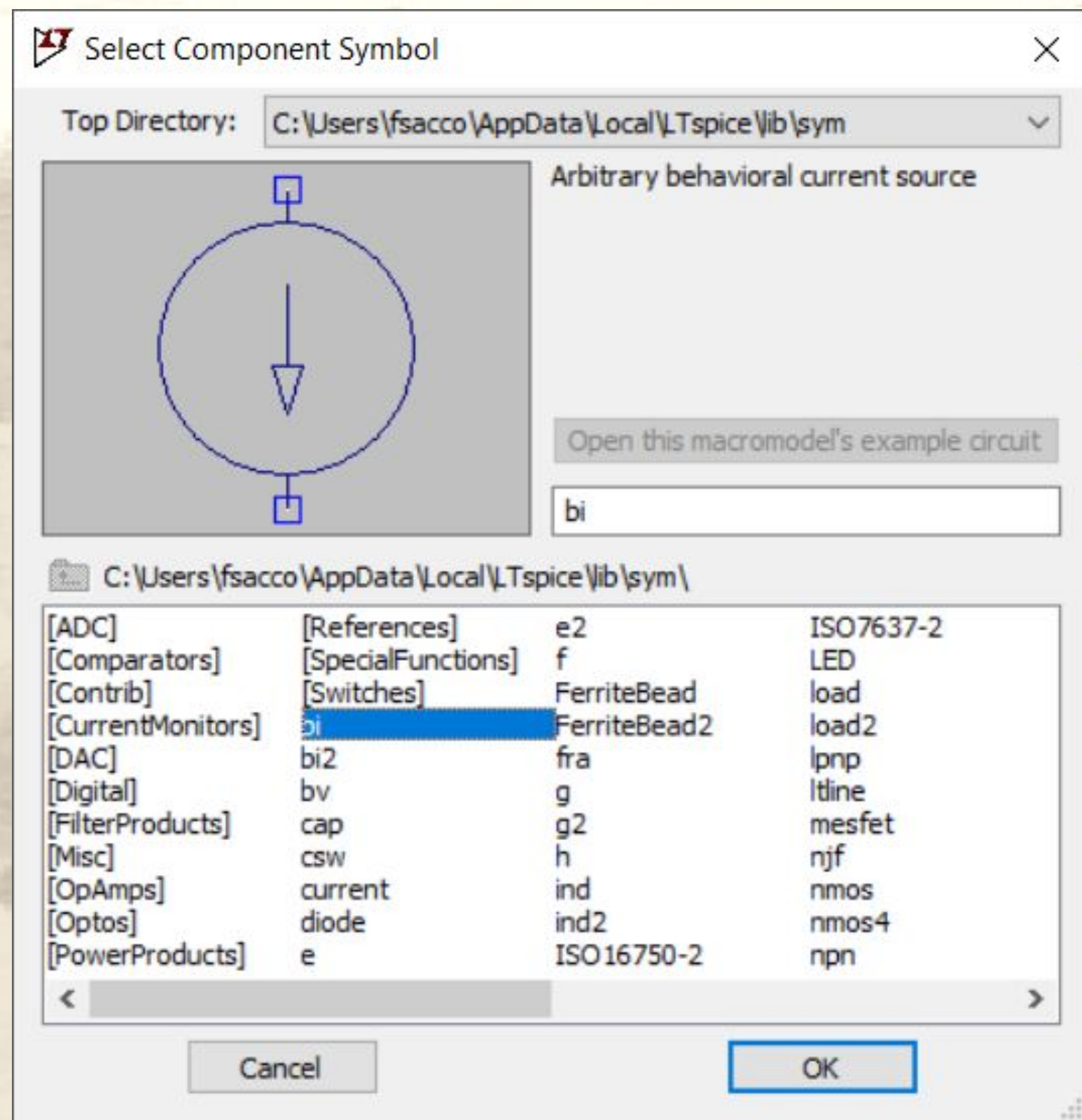
But... what about when we need more complex loads?



Can we simplify this?



# Yes! Using the Arbitrary Behavioral Current Source.



It is possible to implement a chain based on a mathematical function.



And this component respects the same mathematical functions that we saw previously.

LTspiceHelp

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Type in the keyword to find:

Waveform Arithmetic

.AC -- Perform an AC analysis

.BACKANNO -- Annotate the subcircuit pin names on to the port

.DC -- Perform a DC source analysis

END

ENDS

.Ferret -- Download a File Given the URL

.FOUR -- Compute a Fourier Component after a .TRAN Analysis

.FUNC -- User Defined Functions

.GLOBAL -- Declare global nodes

.IC -- set initial conditions

.INCLUDE -- include another file

.LIB -- Include a library

.LOADBIAS -- Load a previously solved DC solution

.MACHINE -- Arbitrary State Machine

.MEASURE -- Evaluate User-Defined Electrical Quantities

.MODEL

.NET -- Compute Network Parameters in a .AC Analysis

.NODESET -- supply hints for initial DC solution

.NOISE -- Perform a noise analysis

.OP -- Find the DC operating point

.OPTIONS -- Set simulator options

.PARAM -- User-defined parameters

.SAVE -- Limit the amount of saved data.

.SAVEBIAS -- Save operating point to disk

.STEP -- Parameter sweeps

.SUBCKT -- define a subcircuit

.TEMP -- Temperature sweeps

.TEXT -- User-defined strings

.TF -- Find the DC small signal transfer function

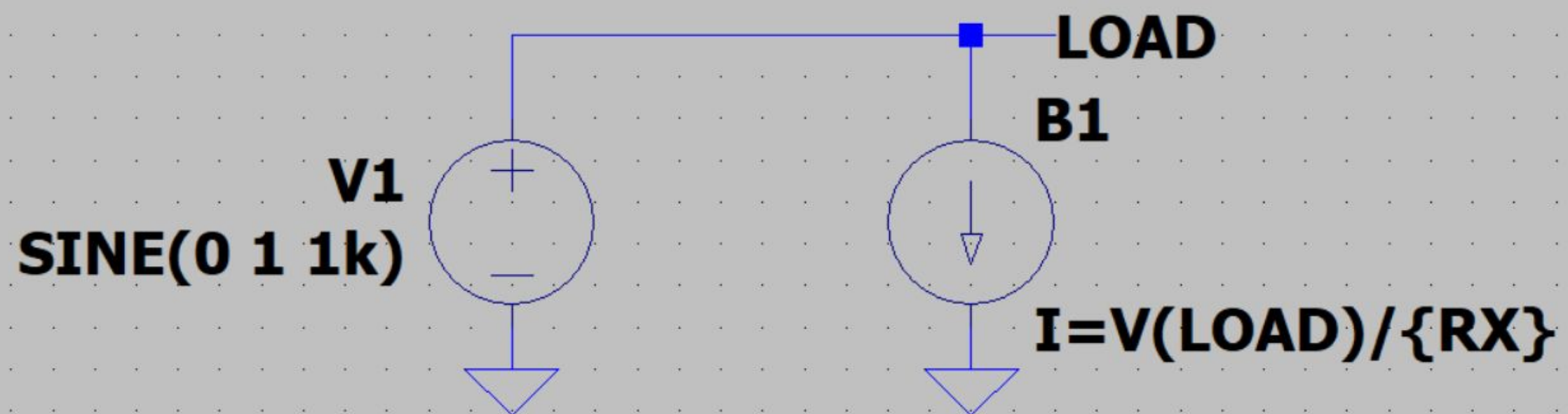
.TRAN -- Do a non-linear transient analysis

Display

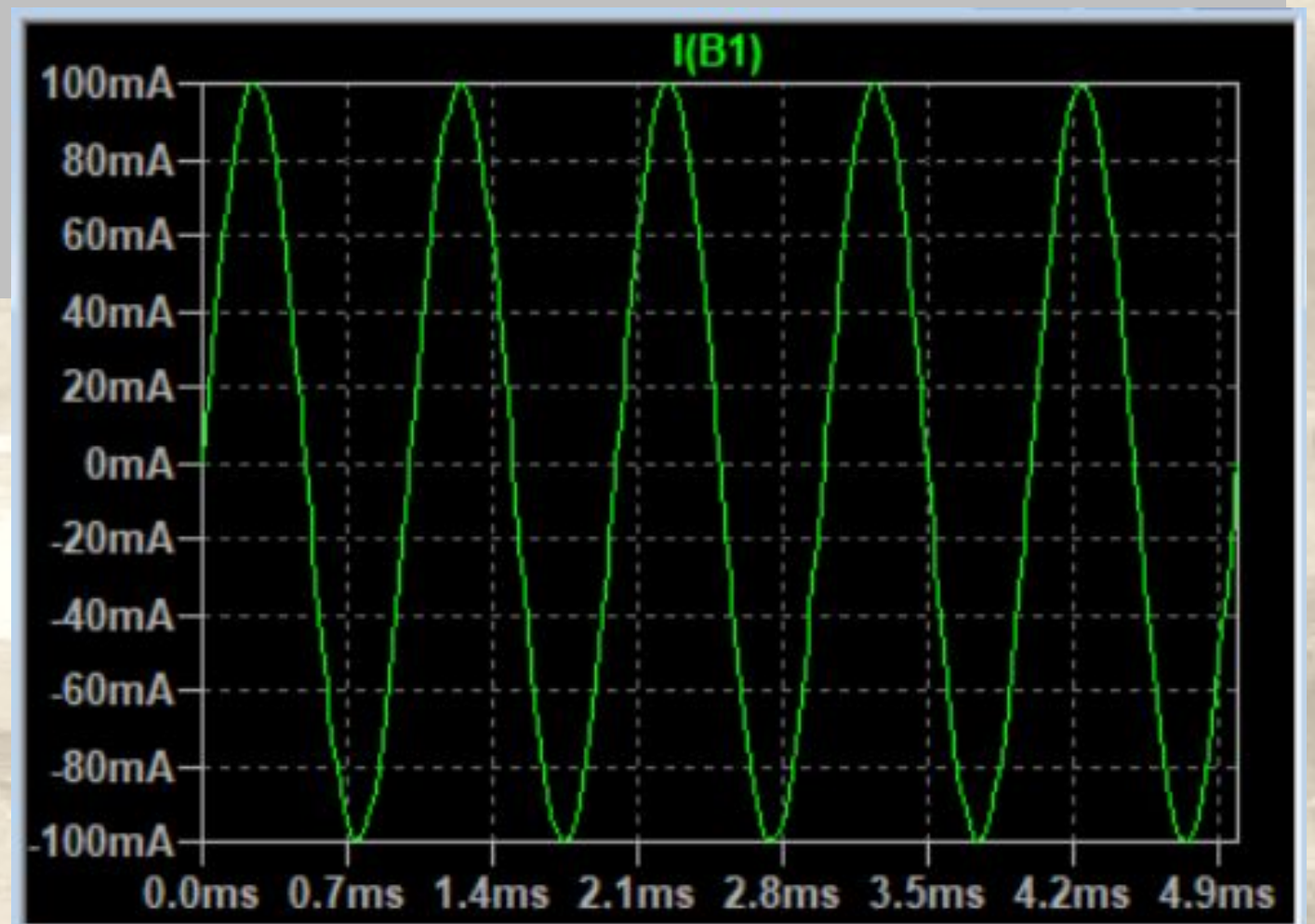
Function Name	Description
abs(x)	Absolute value of x
acos(x)	Arc cosine of x
arccos(x)	Synonym for acos()
acosh(x)	Arc hyperbolic cosine
asin(x)	Arc sine of x
arcsin(x)	Synonym for sin()
asinh(x)	Arc hyperbolic sine
atan(x)	Arc tangent of x
arctan(x)	Synonym for atan()
atan2(y,x)	Four quadrant arc tangent of y/x
atanh(x)	Arc hyperbolic tangent
buf(x)	1 if x > .5, else 0
ceil(x)	Integer equal or greater than x
cos(x)	Cosine of x
cosh(x)	Hyperbolic cosine of x
d()	Finite difference-based derivative



For example...  
once we know that  $I=V/R$ , it is easy to  
create a resistive load.



```
.PARAM RX 10  
.tran 0 100m 0 100n
```

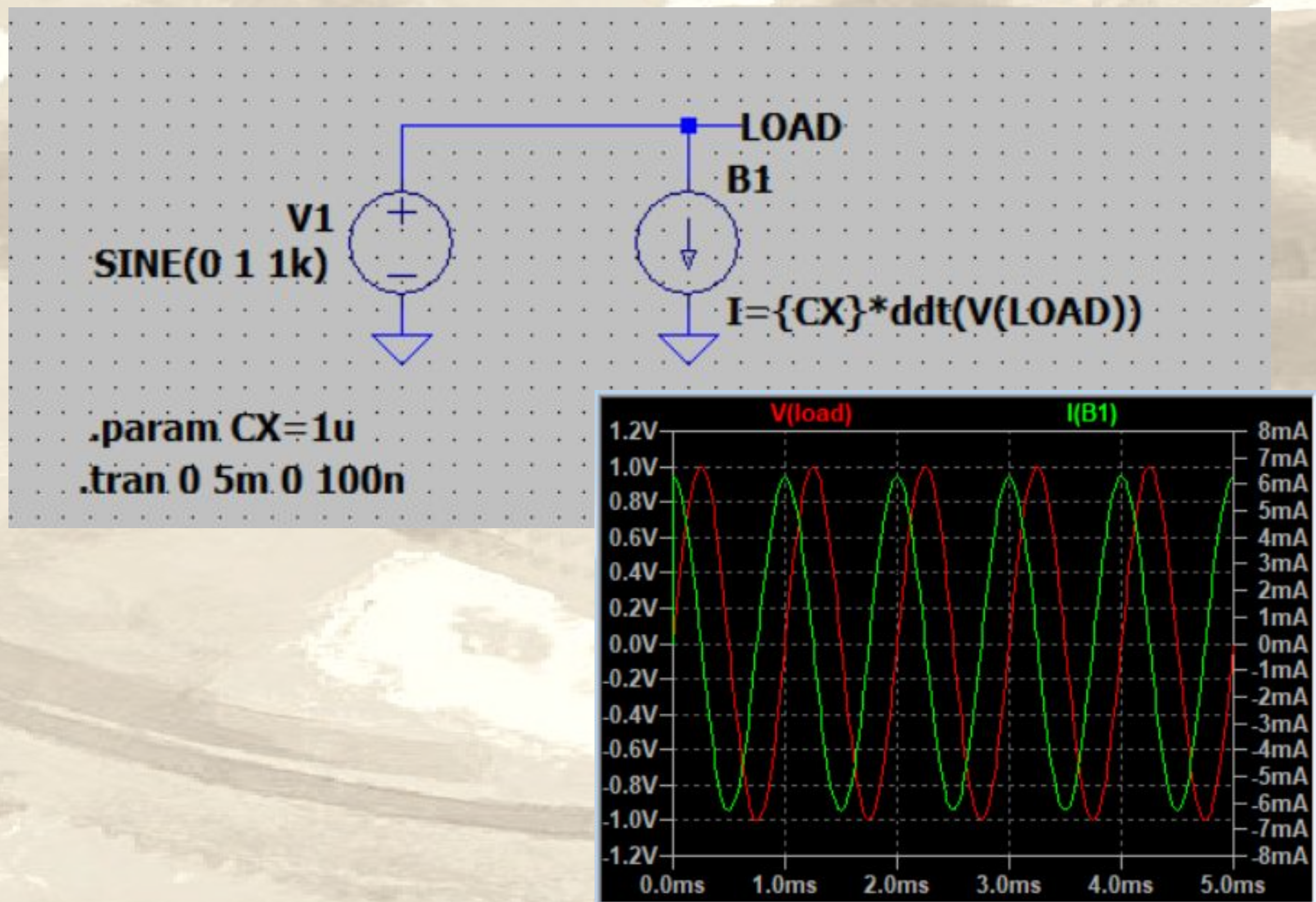




# The current over a capacitor is:

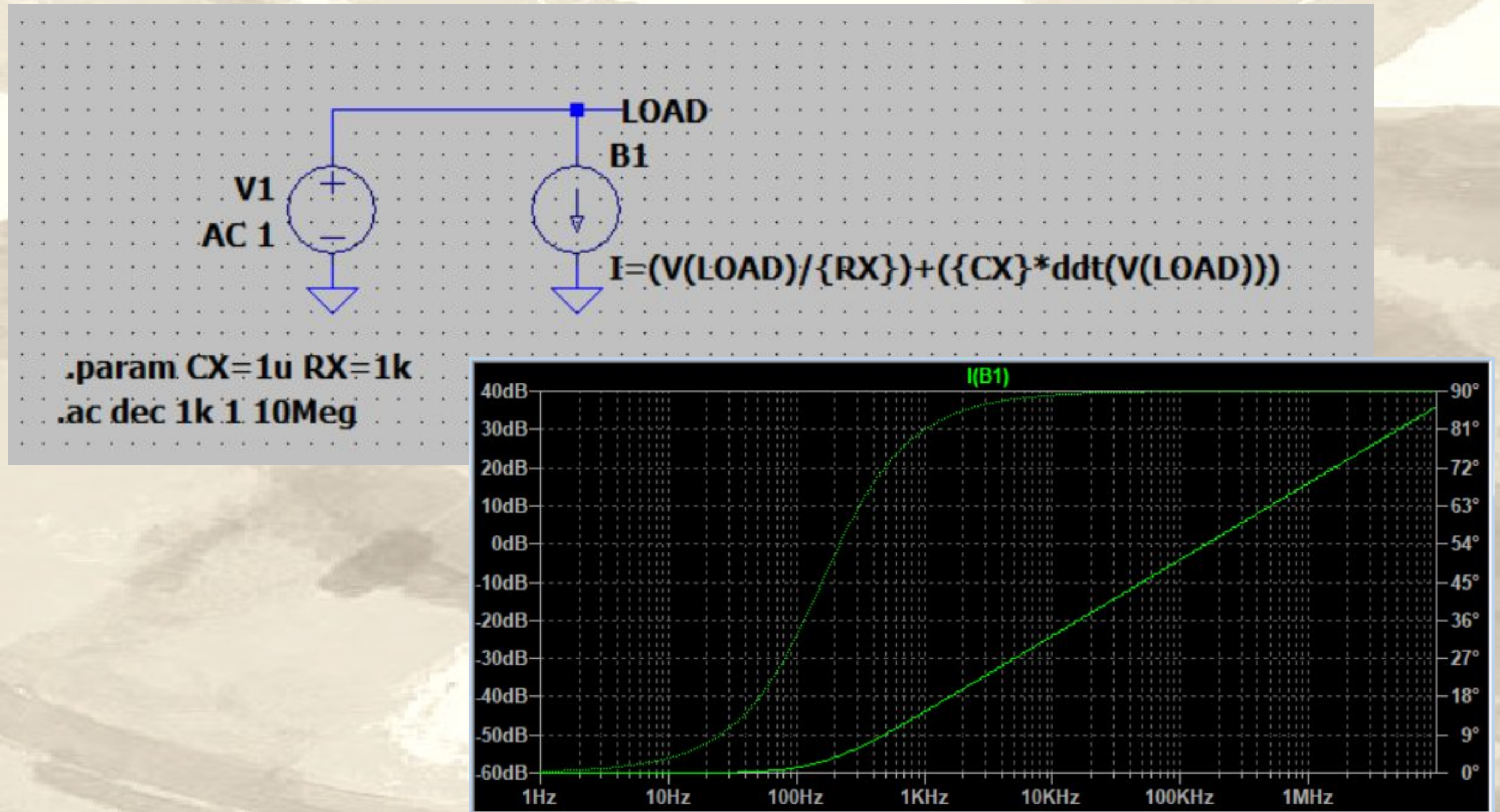
$$i(t) = C \frac{dv(t)}{dt}$$

# The math function ddt() can do this job.





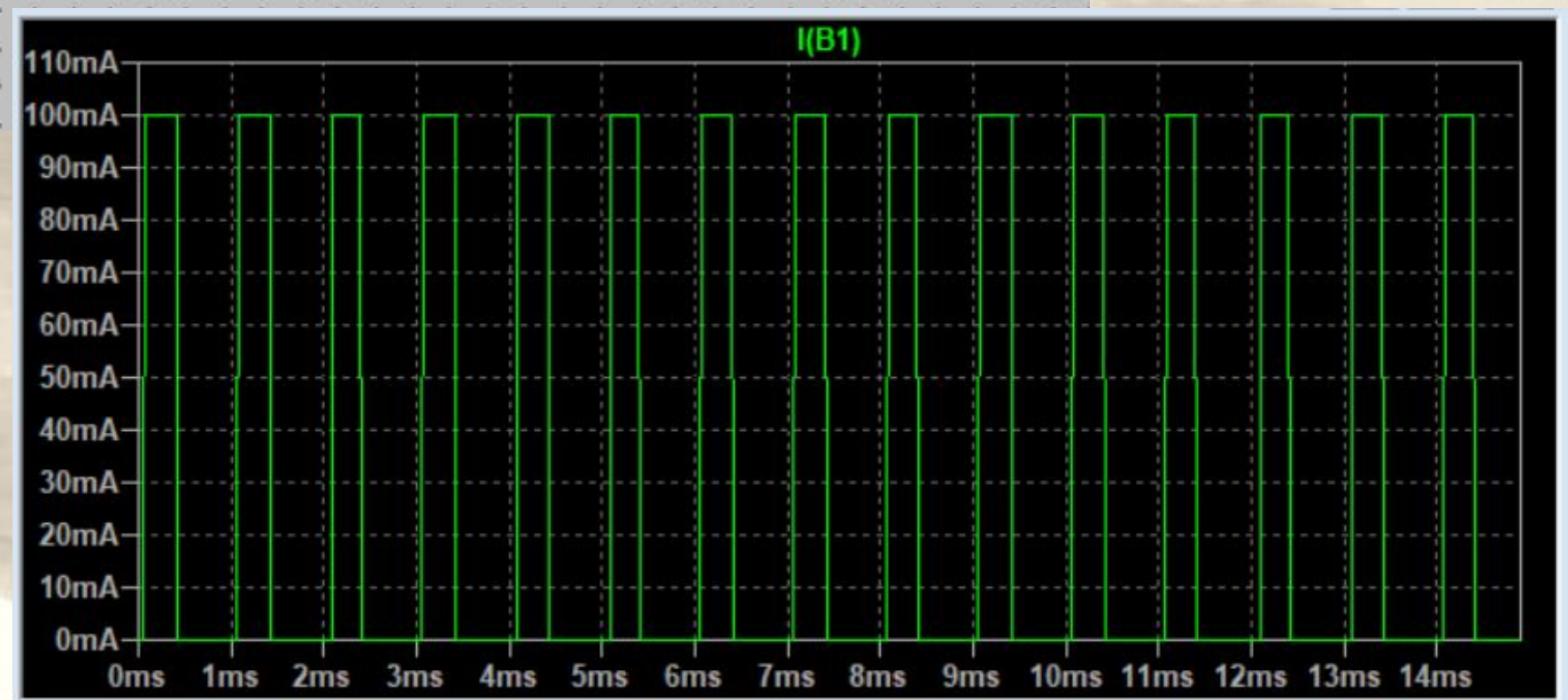
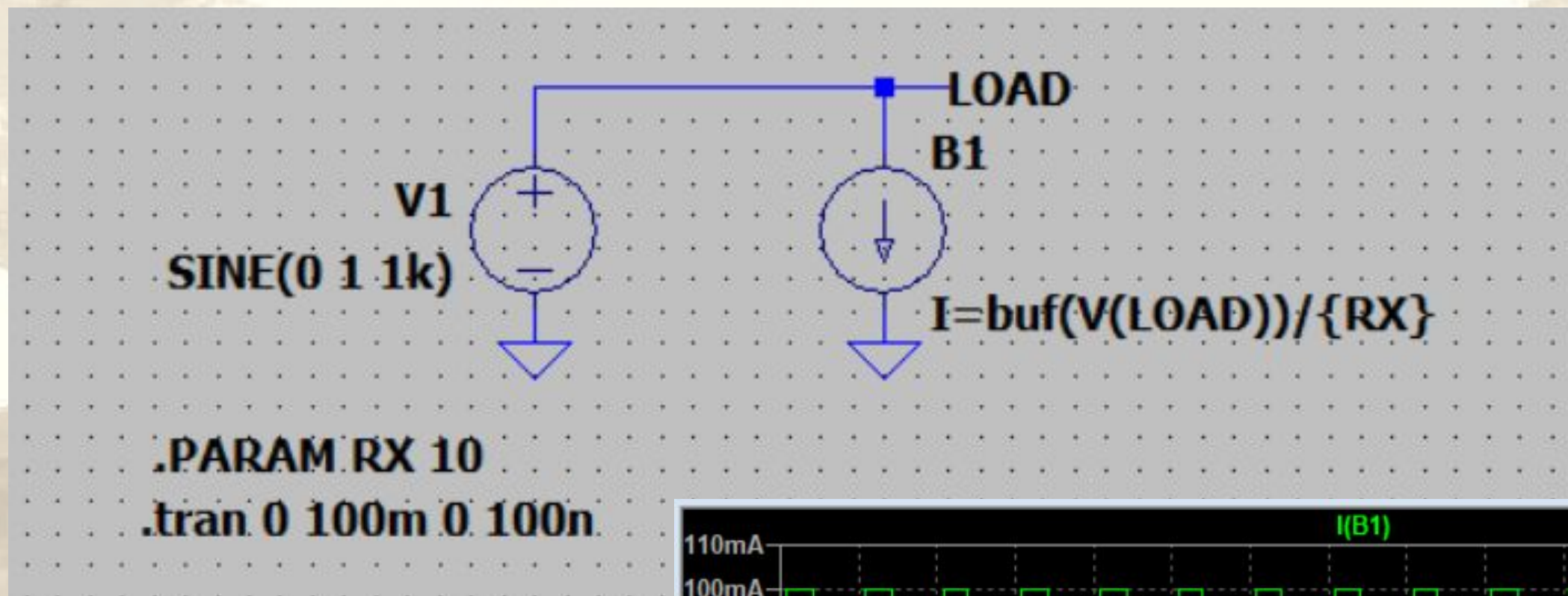
A composition of fillers can be made. Here we have a resistive load in series with a capacitive one.



It is even possible run an AC analysis on loads like this.



It is the perfect solution for complex and non-linear loads.



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