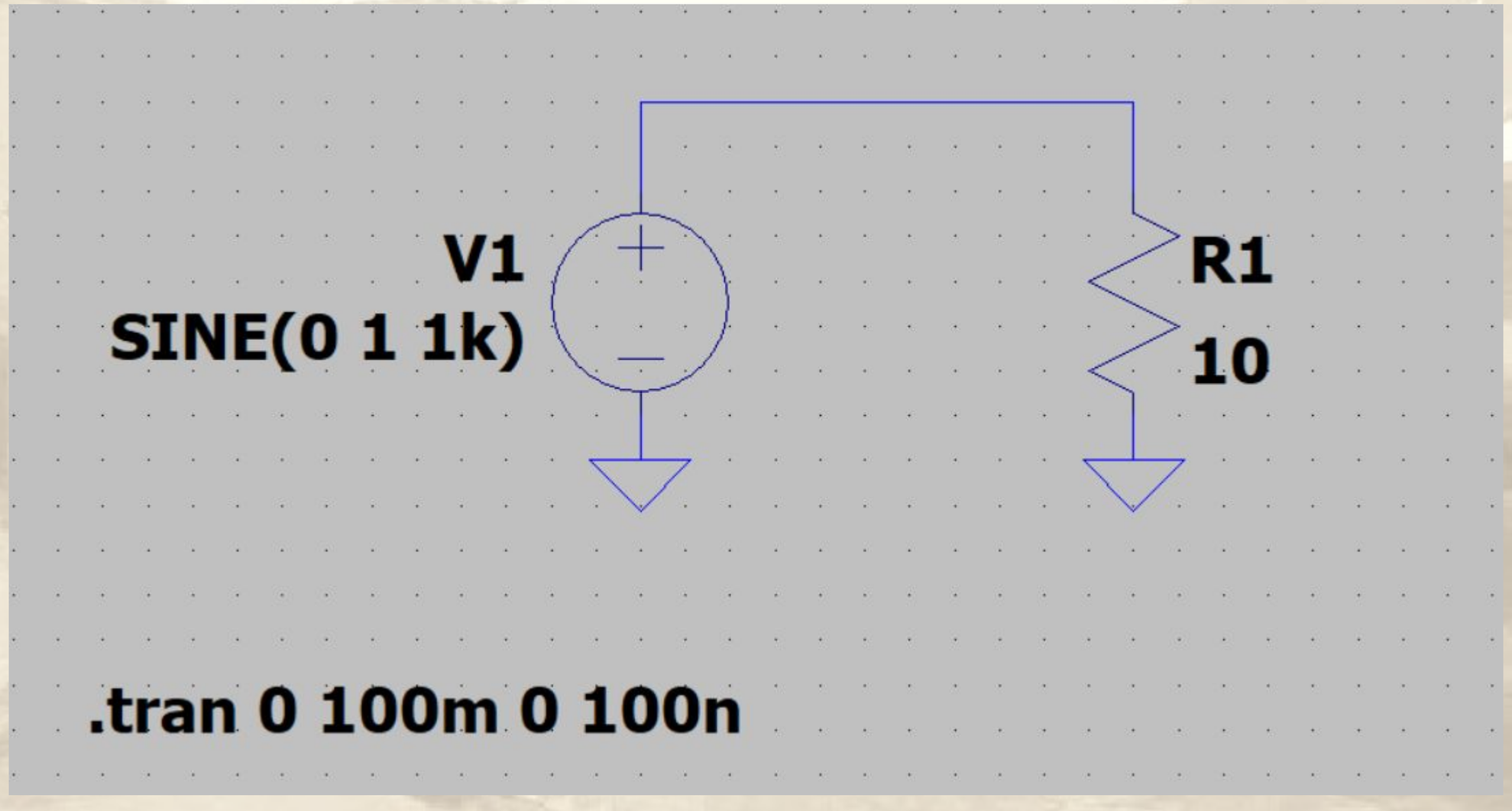
Drops of LTSpice

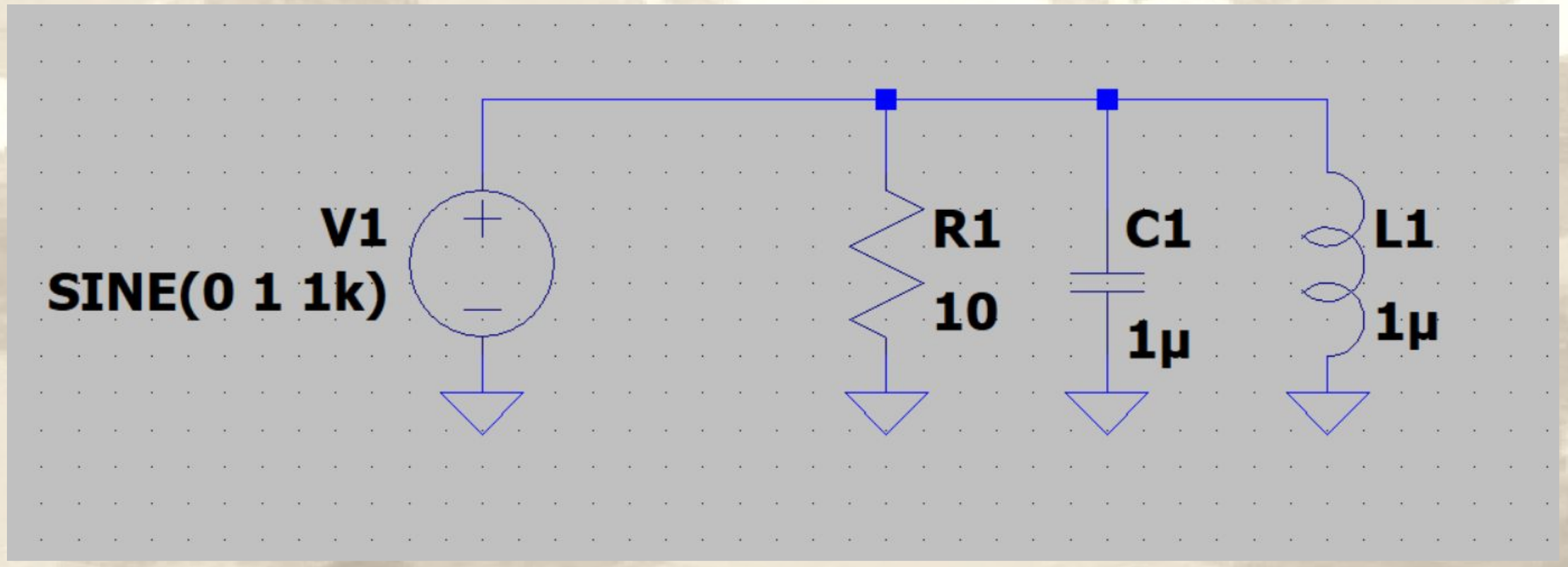
Using arbitrary current sources as Loads

Everyone has done something like this...



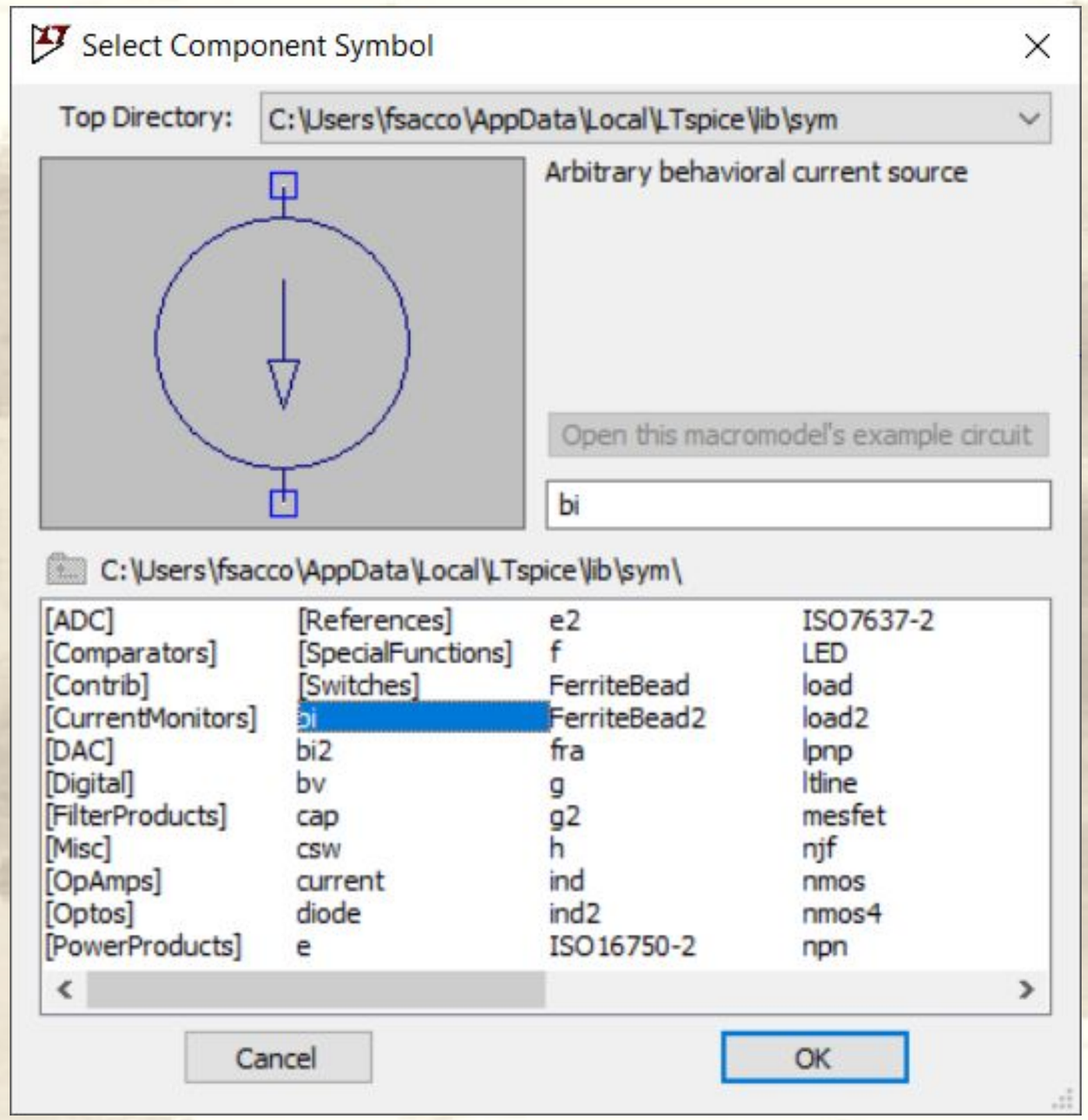
It is a voltage source and a load. It could not be simpler.

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



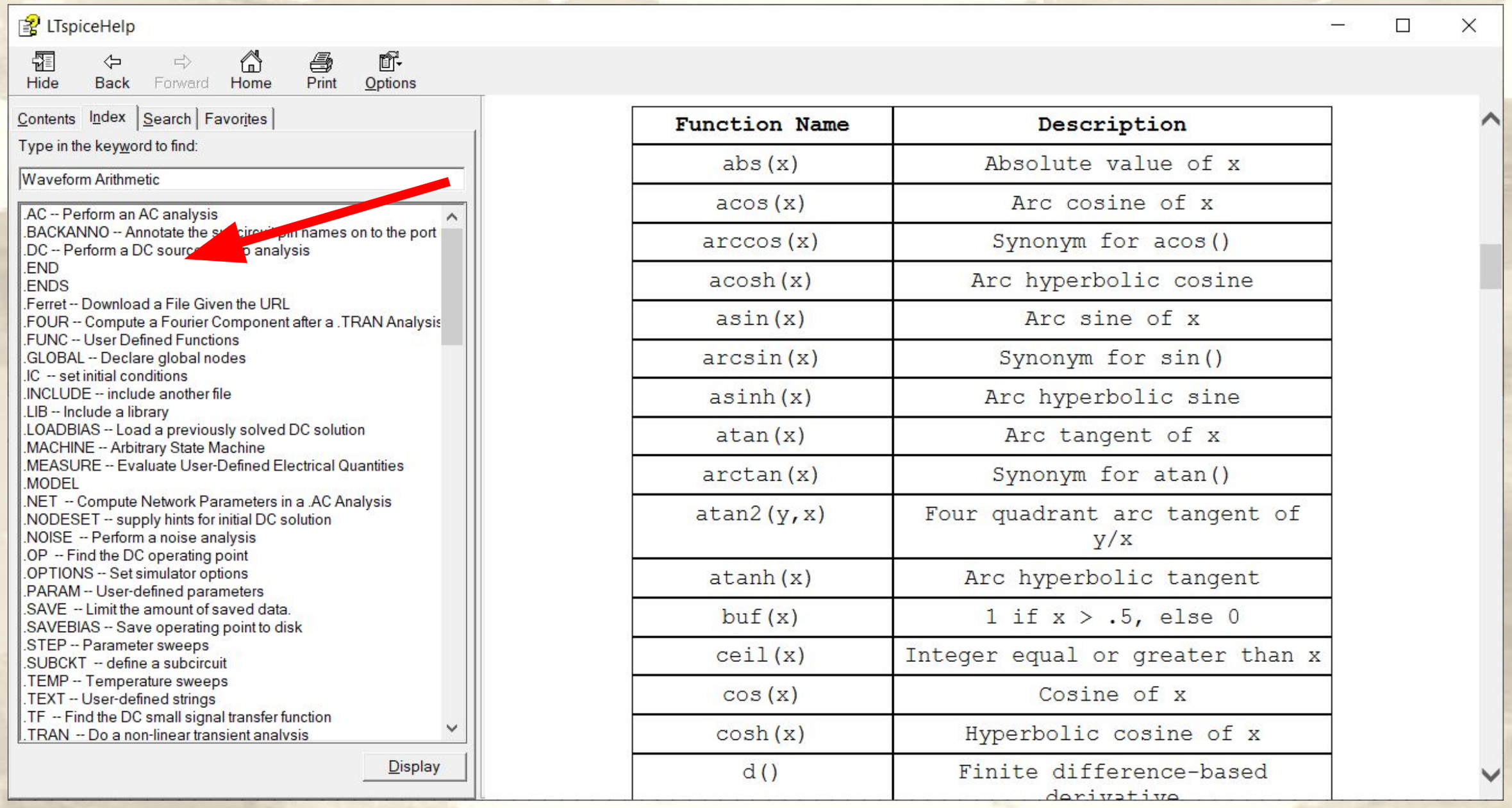
Can we simplify this?

Yes! Using the Arbitrary Behavioral Current Source.



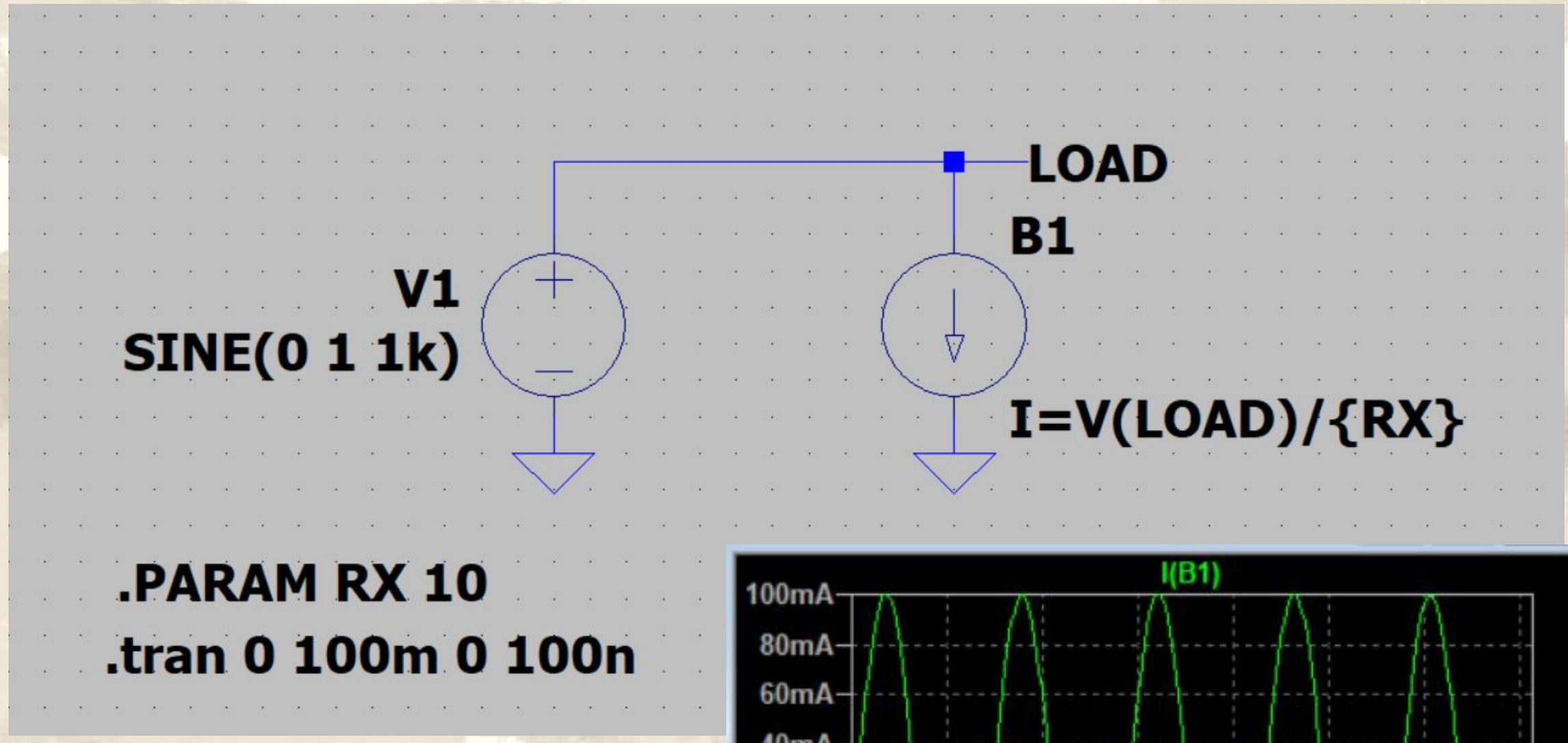
It is possible to implement a chain based on a mathematical function.

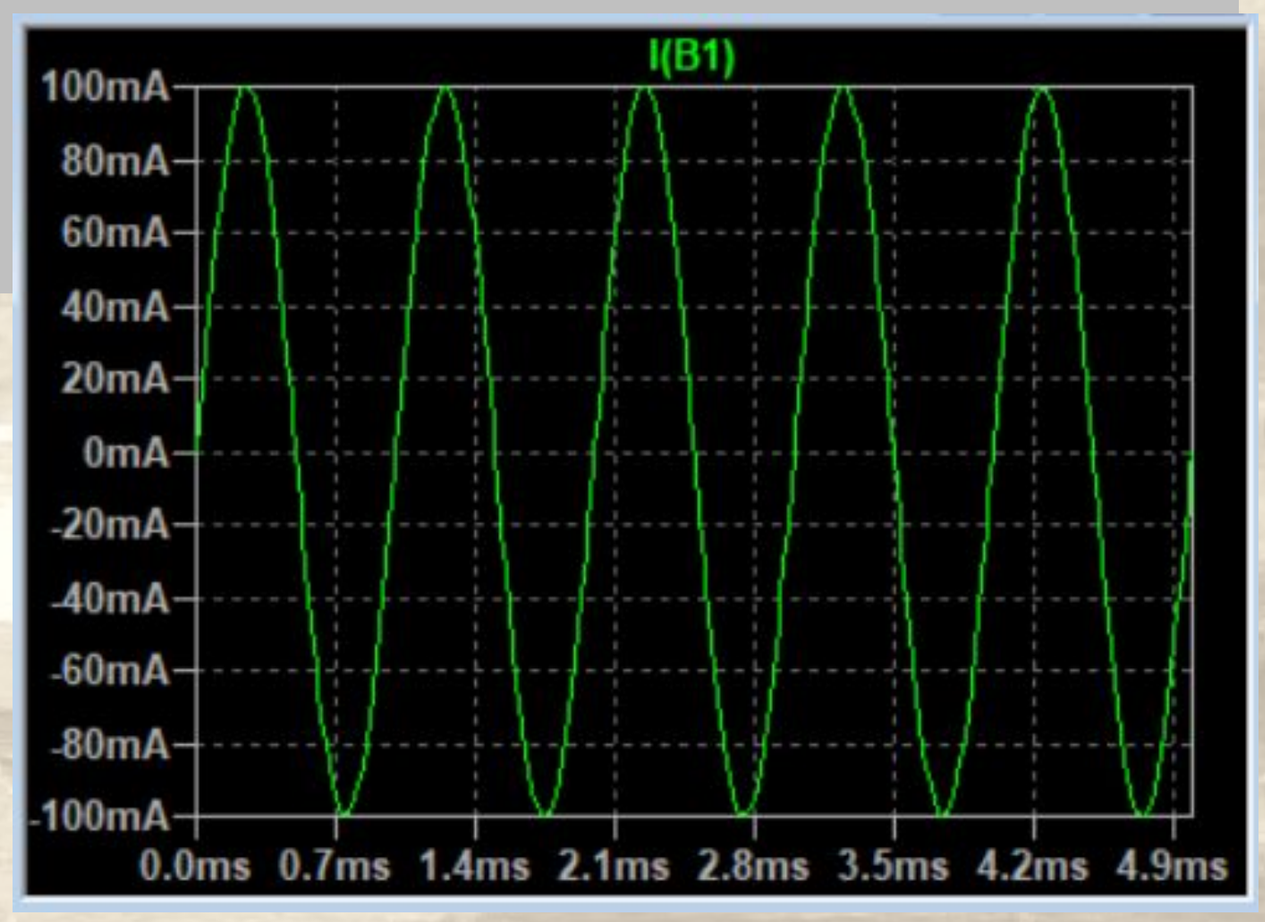
And this component respects the same mathematical functions that we saw previously.



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.

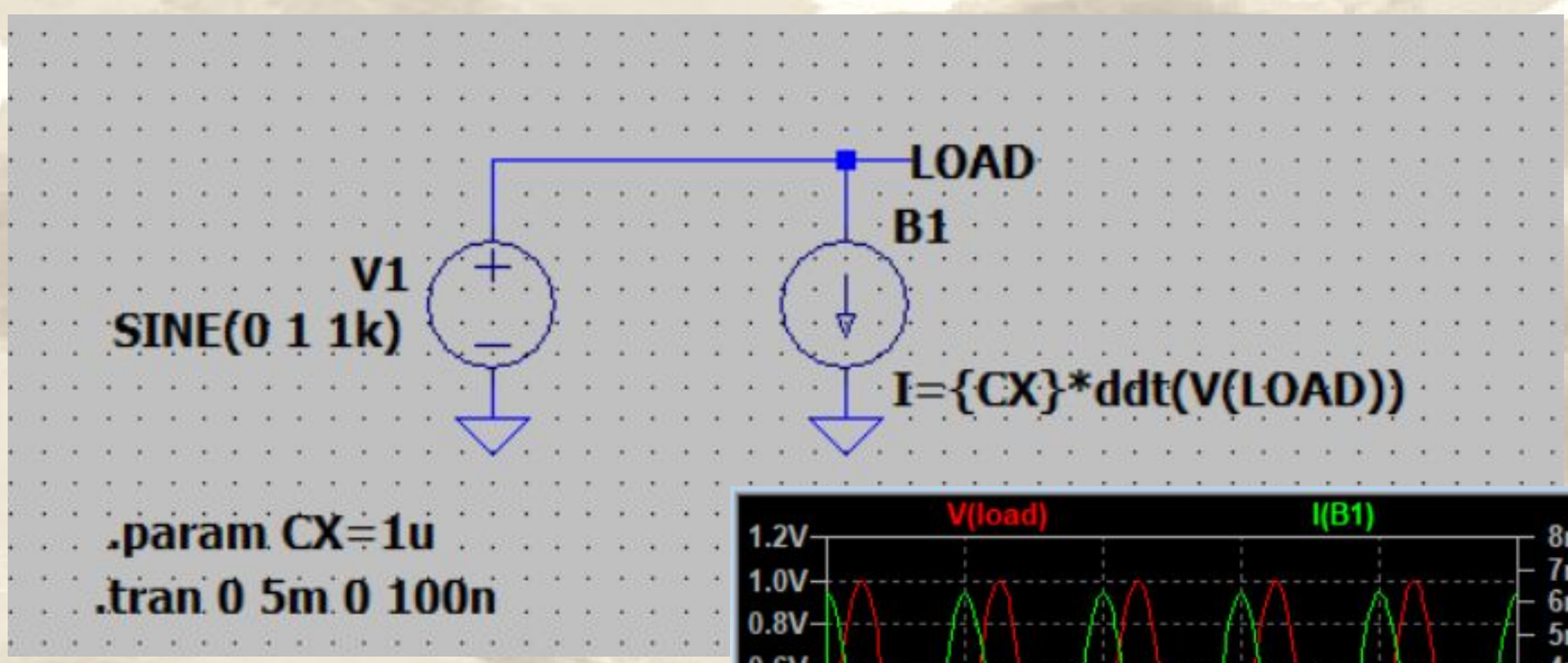


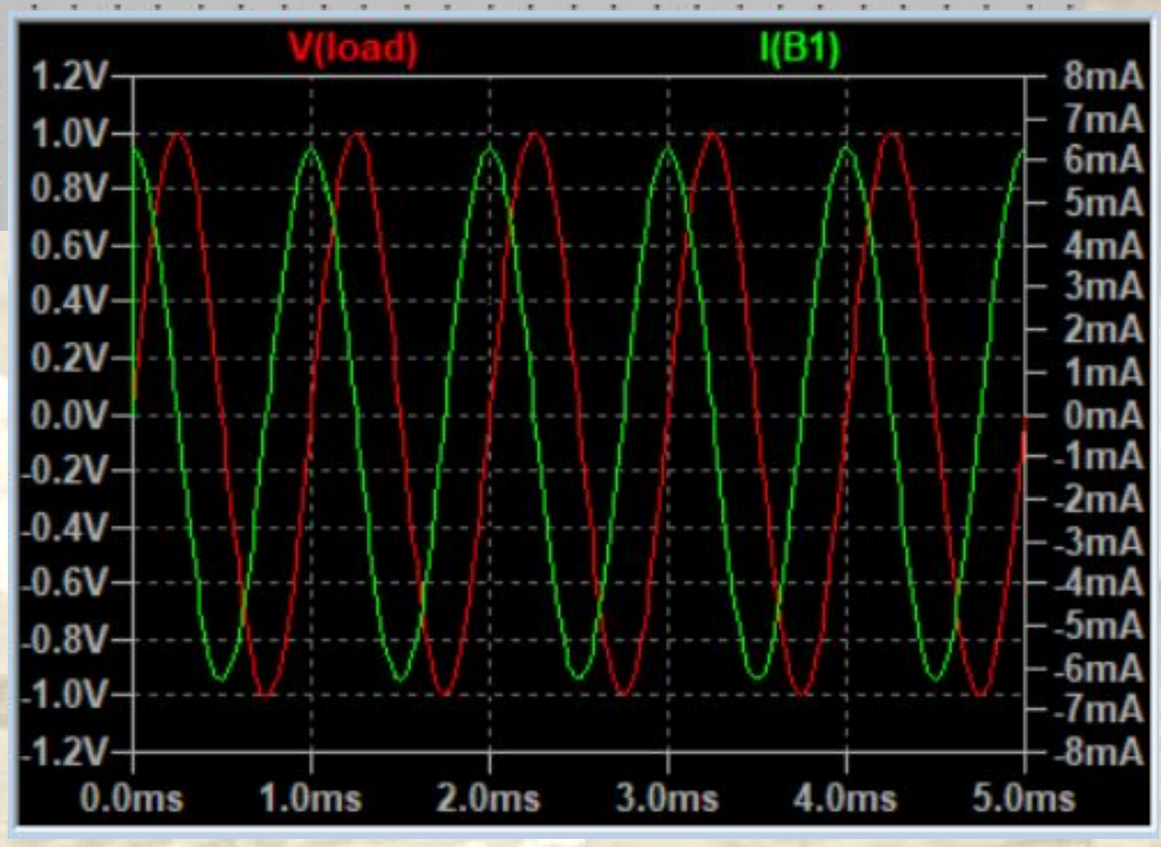


The current over a capacitor is:

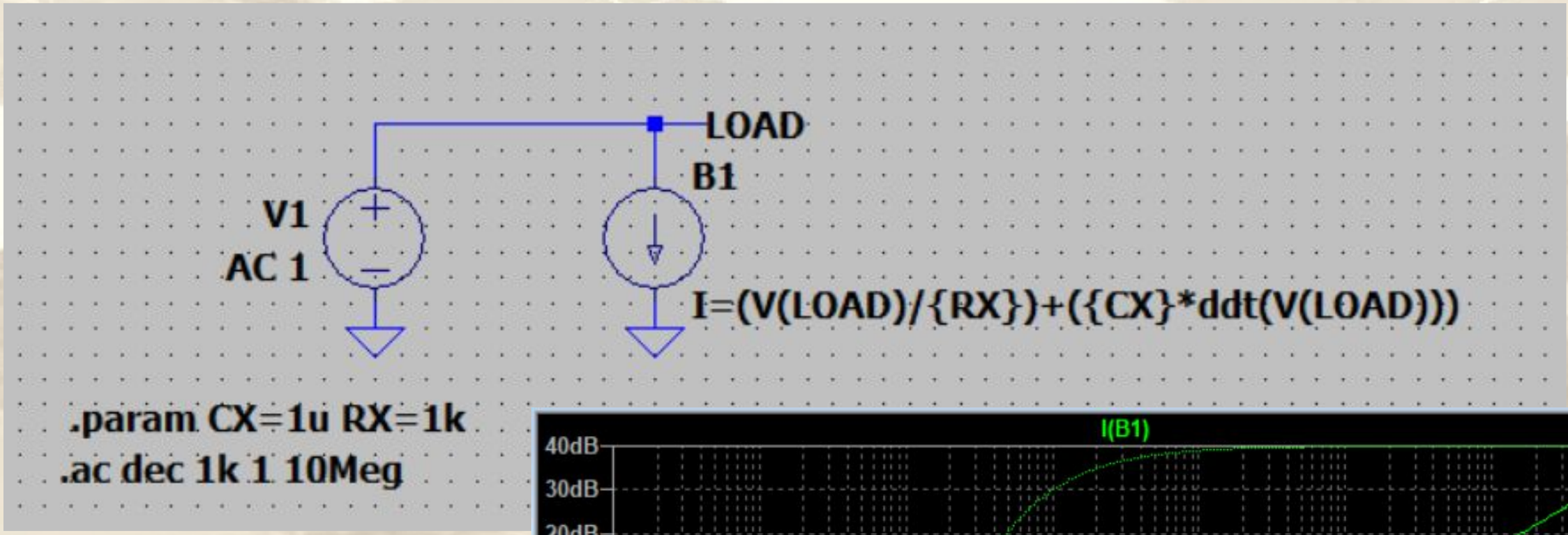
$$i(t) = C\frac{dv(t)}{dt}$$

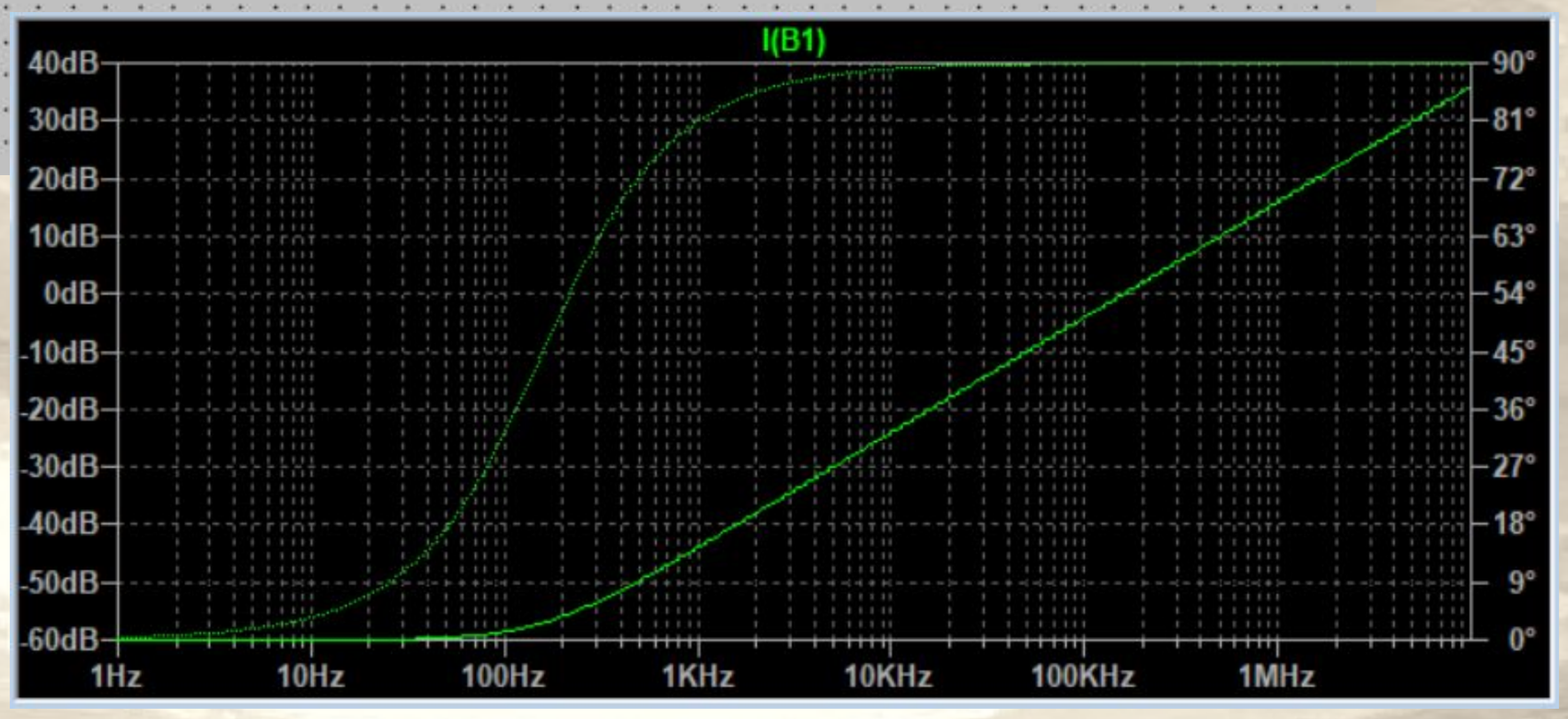
The math function ddt() can do this job.





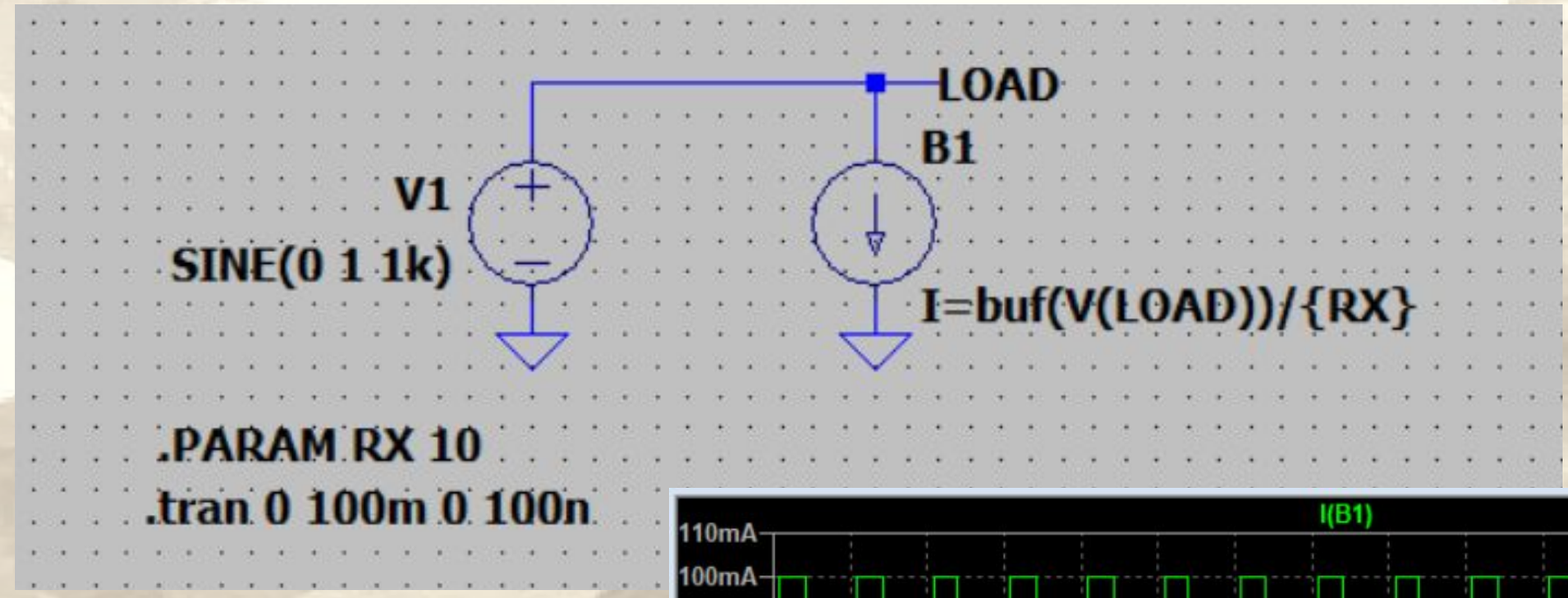
A composition of fillers can be made. Here we have a resistive load in series with a capacitive one.

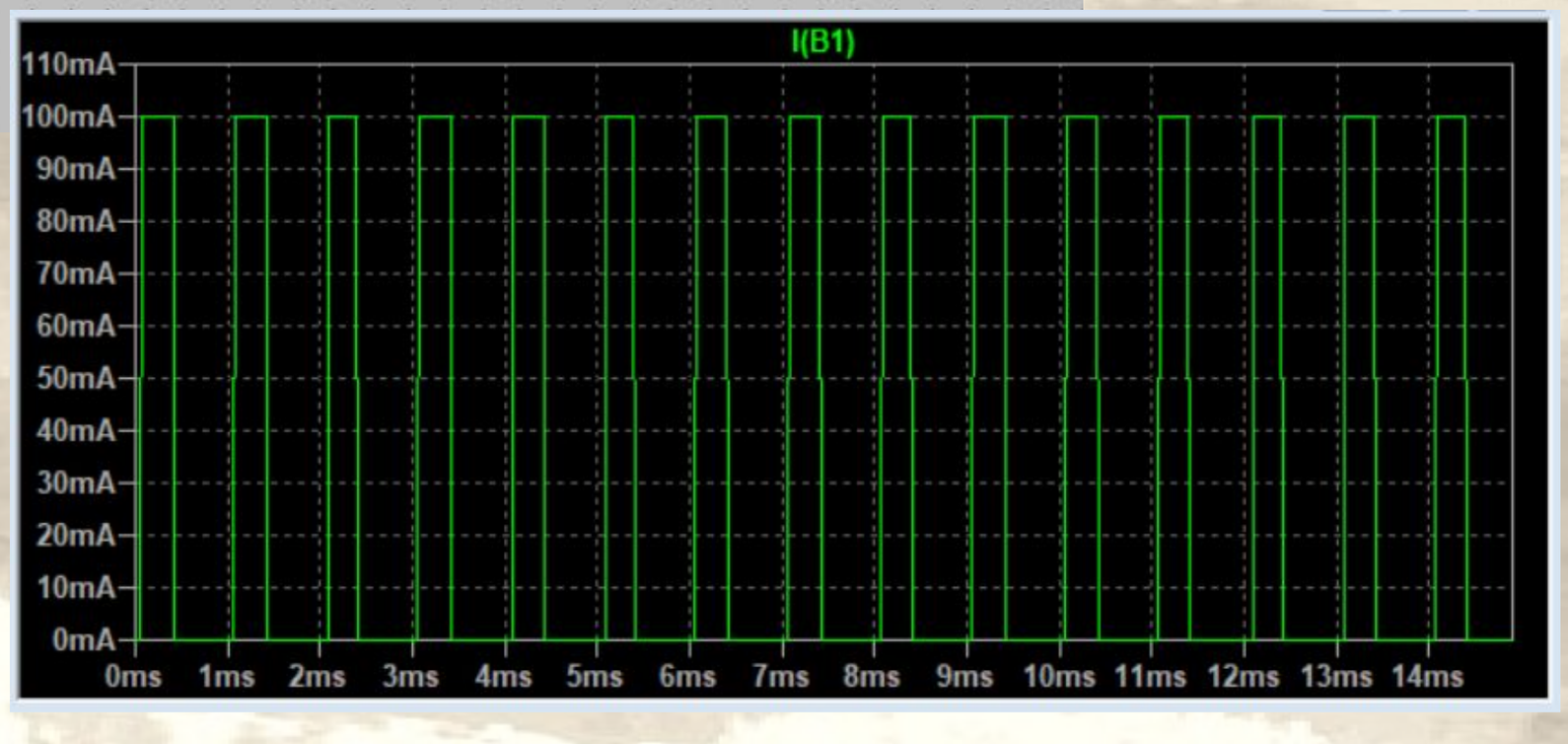




It is even possible run an AC analysis on loads like this.

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





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