

NONLINEAR DYNAMICS SUPERSEDES...

Analyzing Impedance

0:00 11:33

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Analyzing Impedance



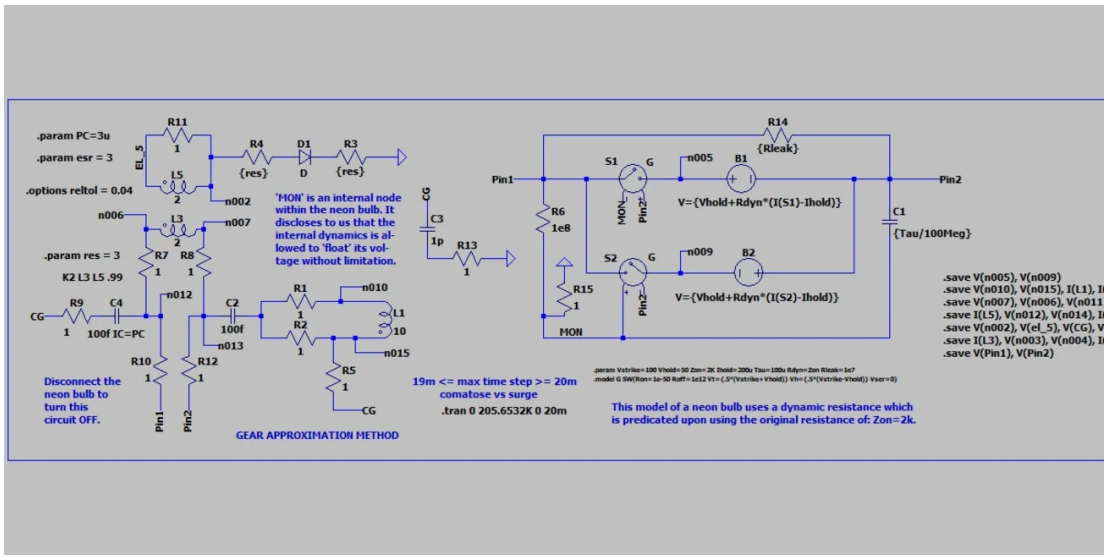
VINYASI

OCT 10, 2026

I made some oversights in yesterday’s analysis at the bottom of:

Mirrored Symmetric Circuit Simulation in LTSpice. Measuring Ohms to Determine which Components are Sources, which are Sinks, and which ones Refuse to Participate. pt. 7

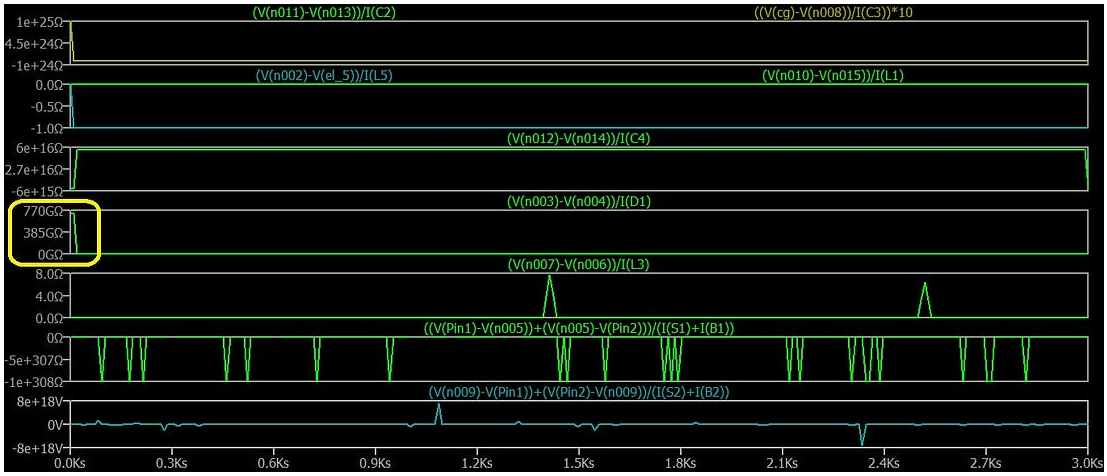
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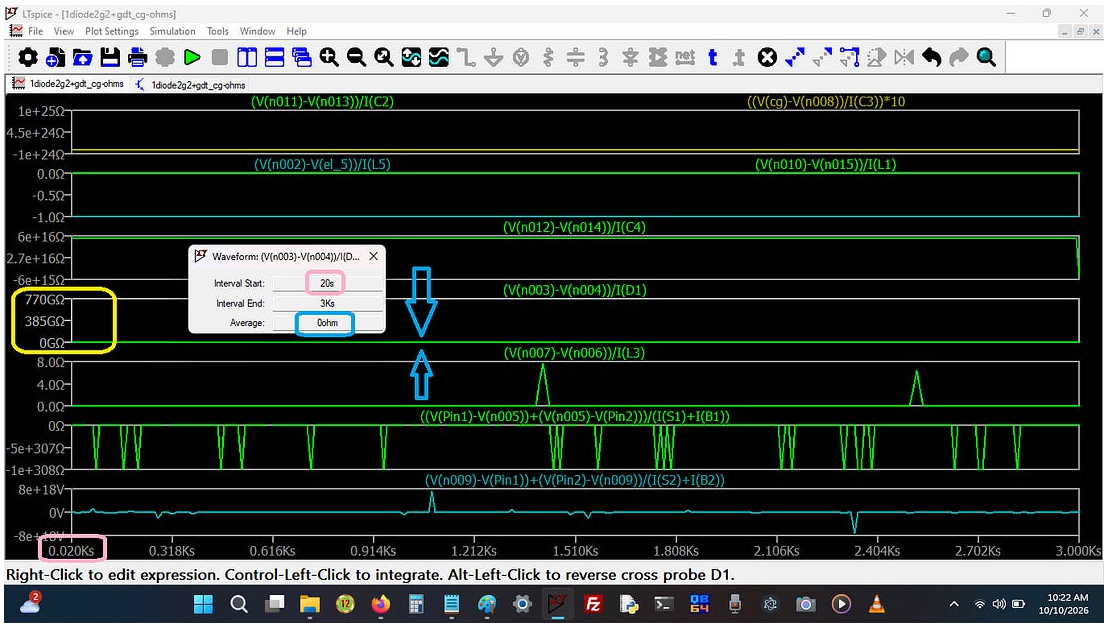


It's quite a challenge to determine from where does anomalous energy arise when there's no obvious 'source' to make that determination in an easy and straightforward manner.

Read full story

... in which I overlooked how the diode decreases its large impedance to zero after 20 seconds:





I would not have been alerted to this if I hadn't looked at the diode column of output values in the data file:

> time (V(n003)-V(n004))/I(D1)
>
> 0.000000000000000e+00 7.169929e+11 ← THERE'S JUST ONE NON-ZERO ENTRY
>
> 1.999355443105068e+01 0.000000e+00
>
> 4.047355443105175e+01 0.000000e+00
>
> 6.095355443105495e+01 0.000000e+00
>
> 8.143355443105196e+01 0.000000e+00
>
> 1.019135544310479e+02 0.000000e+00
>
> 1.223935544310438e+02 0.000000e+00
>
> 1.428735544310503e+02 0.000000e+00

1.633535544310608e+02 0.000000e+00

1.838335544310713e+02 0.000000e+00

2.043135544310817e+02 0.000000e+00

2.247935544310922e+02 0.000000e+00

2.452735544311027e+02 0.000000e+00

2.657535544310993e+02 0.000000e+00

2.862335544310807e+02 0.000000e+00

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3.476735544310248e+02 0.000000e+00

3.681535544310062e+02 0.000000e+00

3.886335544309875e+02 0.000000e+00

4.091135544309689e+02 0.000000e+00

4.295935544309503e+02 0.000000e+00

4.500735544309317e+02 0.000000e+00

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4.910335544308944e+02 0.000000e+00

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5.524735544308386e+02 0.000000e+00

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5.934335544308013e+02 0.000000e+00

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9.415935544304847e+02 0.000000e+00

9.620735544304661e+02 0.000000e+00

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1.146393554430299e+03 0.000000e+00

1.166873554430280e+03 0.000000e+00

1.187353554430261e+03 0.000000e+00

1.207833554430243e+03 0.000000e+00

1.228313554430224e+03 0.000000e+00

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1.310233554430150e+03 0.000000e+00

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2.661913554428920e+03 0.000000e+00

2.682393554428902e+03 0.000000e+00

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2.825753554428771e+03 0.000000e+00

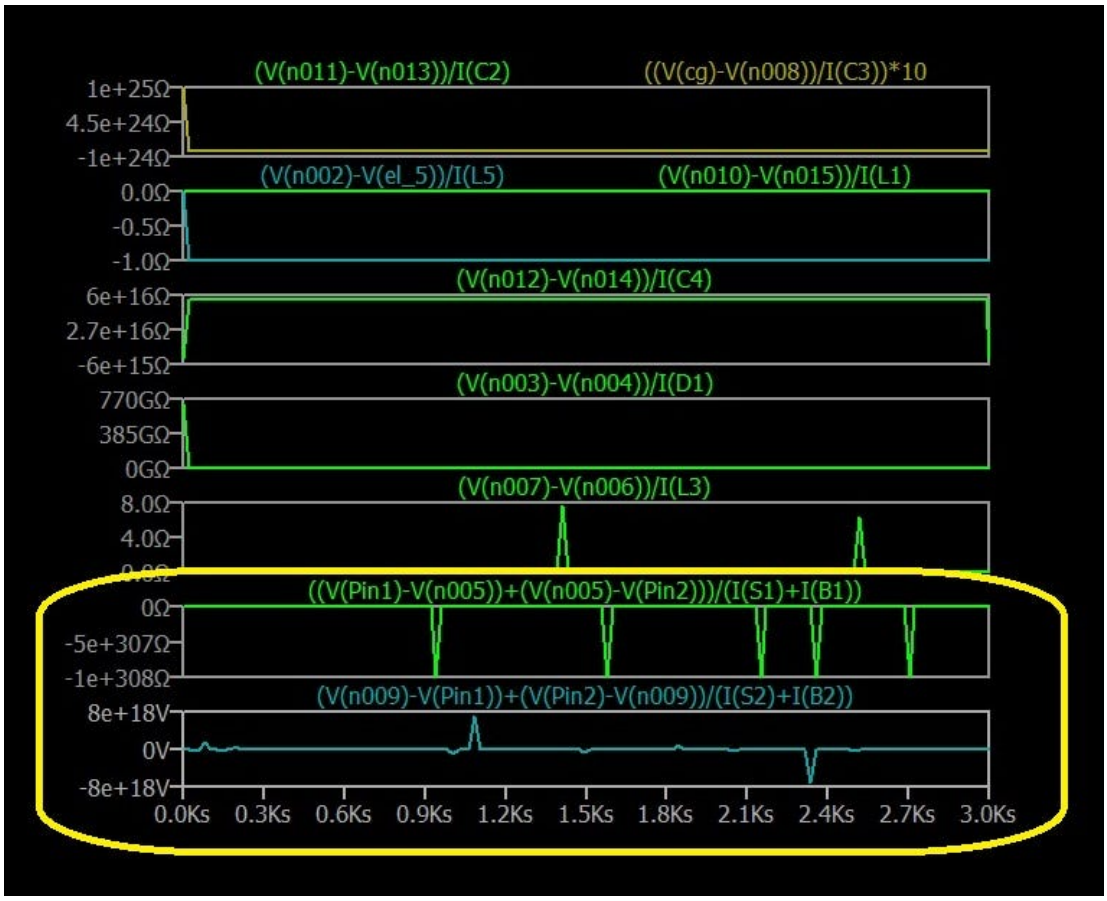
2.846233554428753e+03 0.000000e+00

2.866713554428734e+03 0.000000e+00

> `2.887193554428715e+03 0.000000e+00`
>
> `2.907673554428697e+03 0.000000e+00`
>
> `2.928153554428678e+03 0.000000e+00`
>
> `2.948633554428659e+03 0.000000e+00`
>
> `2.969113554428641e+03 0.000000e+00`
>
> `2.989593554428622e+03 0.000000e+00`
>
> `3.000000000000000e+03 0.000000e+00`

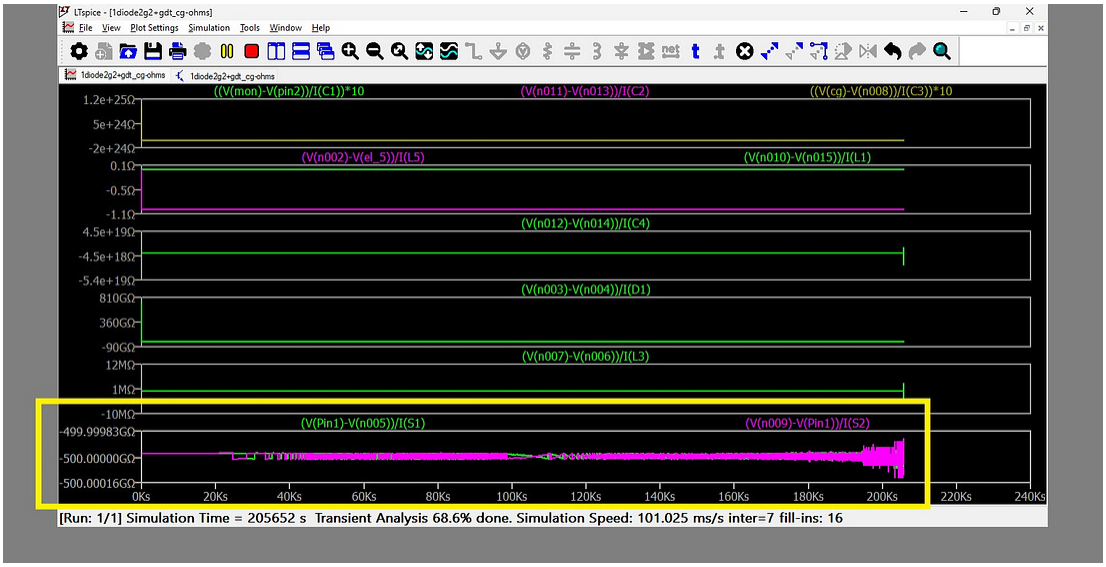
That's weird.

You'll notice that I redid the switch outputs by combining their behavioral dynamic resistances, B1 and B2:



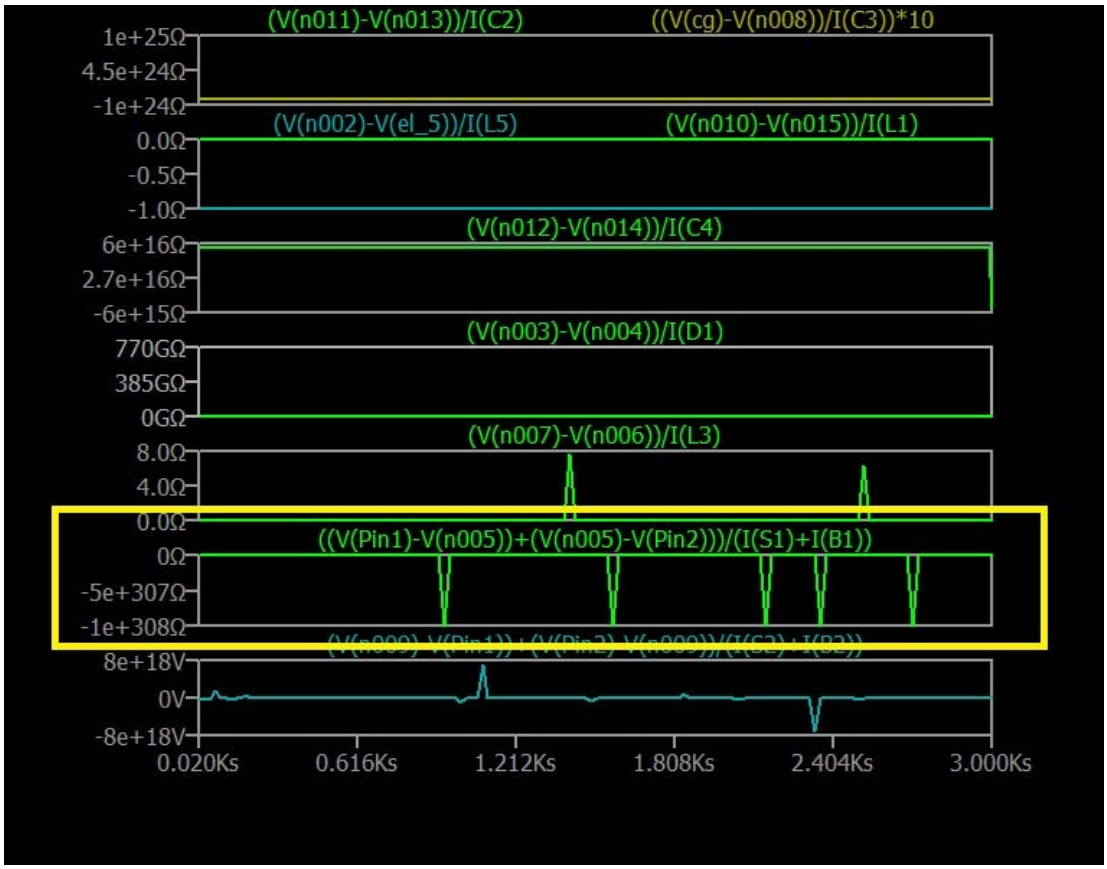
INFINITE IMPEDANCE OF SWITCHES S1 AND S2 PLUS
THEIR DYNAMIC IMPEDANCES OF B1 AND B2.

That’s giving a very different result on switch S1 than without the addition of B1 from the previous post:



BUT WHEN SWITCHES S1 AND S2 ARE CONSIDERED WITHOUT THEIR DYNAMIC IMPEDANCES OF B1 AND B2, THEN WE GET AN INACCURATE AND INCOMPLETE DIAGNOSIS SINCE REMOVING THE RESISTANCE OF A CLOSED SWITCH CONDITION (WHEN IT IS ‘ON’) LEFT US WITH ONLY HALF OF THE DEFINITION FOR EACH SWITCH. OOPS!

… in which switch S1 plus its dynamic resistance of B1 yields spikes of negatively infinite impedance!



time ((V(Pin1)-V(n005))+(V(n005)-V(Pin2)))/(I(S1)+I(B1))

0.000000000000000e+00 0.000000e+00

1.999355443105068e+01 0.000000e+00

4.047355443105175e+01 0.000000e+00

6.095355443105495e+01 0.000000e+00

8.143355443105196e+01 0.000000e+00

1.019135544310479e+02 0.000000e+00

1.223935544310438e+02 0.000000e+00

1.428735544310503e+02 0.000000e+00

1.633535544310608e+02 0.000000e+00

1.838335544310713e+02 0.000000e+00

2.043135544310817e+02 0.000000e+00

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2.452735544311027e+02 0.000000e+00

2.657535544310993e+02 0.000000e+00

2.862335544310807e+02 0.000000e+00

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4.295935544309503e+02 0.000000e+00

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4.705535544309130e+02 0.000000e+00

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8.596735544305592e+02 0.000000e+00

8.801535544305406e+02 0.000000e+00

9.006335544305219e+02 0.000000e+00

9.211135544305033e+02 0.000000e+00

9.415935544304847e+02 -1.000000e+308 <<⇐=

9.620735544304661e+02 0.000000e+00

9.825535544304474e+02 0.000000e+00

1.003033554430429e+03 0.000000e+00

1.023513554430410e+03 0.000000e+00

1.043993554430392e+03 0.000000e+00

1.064473554430373e+03 0.000000e+00

1.084953554430354e+03 0.000000e+00

1.105433554430336e+03 0.000000e+00

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1.207833554430243e+03 0.000000e+00

1.228313554430224e+03 0.000000e+00

1.248793554430205e+03 0.000000e+00

1.269273554430187e+03 0.000000e+00

1.289753554430168e+03 0.000000e+00

1.310233554430150e+03 0.000000e+00

1.330713554430131e+03 0.000000e+00

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1.371673554430094e+03 0.000000e+00

1.392153554430075e+03 0.000000e+00

1.412633554430056e+03 0.000000e+00

1.433113554430038e+03 0.000000e+00

1.453593554430019e+03 0.000000e+00

1.474073554430001e+03 0.000000e+00

1.494553554429982e+03 0.000000e+00

1.515033554429963e+03 0.000000e+00

1.535513554429945e+03 0.000000e+00

1.555993554429926e+03 0.000000e+00

1.576473554429907e+03 -1.000000e+308 <<⇐=

1.596953554429889e+03 0.000000e+00

1.617433554429870e+03 0.000000e+00

1.637913554429852e+03 0.000000e+00

1.658393554429833e+03 0.000000e+00

1.678873554429814e+03 0.000000e+00

1.699353554429796e+03 0.000000e+00

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1.740313554429758e+03 0.000000e+00

1.760793554429740e+03 0.000000e+00

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2.088473554429442e+03 0.000000e+00

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2.149913554429386e+03 -1.000000e+308 <<⇐=

2.170393554429367e+03 0.000000e+00

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2.354713554429200e+03 -1.000000e+308 <<⇐=

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2.559513554429013e+03 0.000000e+00

2.579993554428995e+03 0.000000e+00

2.600473554428976e+03 0.000000e+00

2.620953554428957e+03 0.000000e+00

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2.661913554428920e+03 0.000000e+00

2.682393554428902e+03 0.000000e+00

2.702873554428883e+03 -1.000000e+308 <<⇐=

2.723353554428864e+03 0.000000e+00

2.743833554428846e+03 0.000000e+00

2.764313554428827e+03 0.000000e+00

2.784793554428808e+03 0.000000e+00

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>
> 2.969113554428641e+03 0.000000e+00
>
> 2.989593554428622e+03 0.000000e+00
>
> 3.000000000000000e+03 0.000000e+00

What sort of switch has zero impedance for most of its duration interspersed with bursts of infinitely negative impedance? A weird switch! ;-)

A switch which is capable of producing power for its adjoining circuit.

Download this circuit simulation from my Google Docs account or from my website.

List of: Mirrored Symmetric Circuit Simulation in LTSpice - a dialogue with ChatGPT, pts. 1-7

VINYASI · SEP 24

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