Subject: Loadlines
Posted by Shane on Thu, 31 Aug 2006 14:47:27 GMT
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I am learning how to do loadlines from MJ's book and Steve Bench's webpages and just want to make sure I'm understanding it.Looking to draw a loadline for 6EM7 section 2. Steve states that the load (Z)=(max V - quiescent V)/quescient I. I'm looking at Ic=50mA and Vq=210V. Is the load the primary impedance for the OPT? So if I'm using a 5K OPT the max V on the loadline at 0 plate current would be 460V. Then draw a line from the 460V,0mA point through the 210V,50mA point and figure all the other parameters from there?I refuse to build anyhting till I can go through and explain/understand why everything is what it is.Thanks

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Subject: Re: Loadlines
Posted by Manualblock on Thu, 31 Aug 2006 15:23:43 GMT
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Good work Shane. Damir is on vacation but he gets back this week. So you bought Morgan Jones book? Is it worth it or is all that info on the net? I am very interested.

Subject: Re: Loadlines
Posted by Shane on Thu, 31 Aug 2006 15:29:14 GMT
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I have both of Mr. Jones's books, the 3rd edition Valve Amps and the newer Building Valve Amplifiers. I find them both worth every penny. Very informative. Unfortunately my math skills are lacking and I'm having to refresh the old noodle. I found that Steve Benches explanations on loadlines was a bit easier for me to understand, but MJ goes into much more detailed explanation of the "why" something is done.

Subject: Re: Loadlines
Posted by Manualblock on Fri, 01 Sep 2006 01:37:04 GMT
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Thanks; time to whip out the plastic.

Subject: Before you whip out the plastic!
Posted by Shane on Fri, 01 Sep 2006 13:08:38 GMT
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I looked at them both using inter-library loan here at the local public library. Maybe see if you really would want them or not.

Subject: Re: Before you whip out the plastic!
Posted by Manualblock on Fri, 01 Sep 2006 15:13:34 GMT
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Your library system has them? Thats great; let me check that out; although somehow I doubt it. Our libraries are a little behing the times here; we're lucky of they carry Grob's textbook.

Subject: Re: Before you whip out the plastic!
Posted by Shane on Fri, 01 Sep 2006 15:47:46 GMT
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My library didn't have them, but was able to pull them from another state that did.

Subject: Duh!
Posted by Shane on Fri, 01 Sep 2006 19:14:40 GMT
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Um 50mA is a bit much, huh? Let's revise that to 40mA where the Max V point = 410V. Better?

Subject: Re: Loadlines
Posted by Damir on Tue, 05 Sep 2006 13:09:38 GMT
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Hi, I`m back... Load lines - simplified:-the OP you chose (say, 200V/50mA/-30V - with respect to max Ia and Pa values) "determines" your "optimal" load (yes, this is your primary impedance -

simplified). The AC current can "swing" from quiescent value (Iaq=50mA) to the double value, max. 100mA, and from "quiescent" Ug value (-30V from Ua/Ia/Ug diagram for 6EM7-2) to the Ug=0V, max. peak in class A1.-draw the line through our "O" point (200V/50mA/-30V) and through another point, "A" (Ia=100mA, Ug=0V, and we read Ua=63V)-point "B" can be another "extreme", (about 292V/16mA/-60V)-our Ra, or primary load is (from Ohm`s Law) Ra=Ua/Ia, or "voltage swing" divided with "current swing", or:Ra = (UaB - UaA) / (IaB - IaA) = (292-63)/(0,1-0,016) = 2,7 kOhms-of course, you can just "extend" your line to the apsis and ordinate, to simplify Ra graphical finding, where Ia=0 and Ua=0, and you haveRa = 335/0,125 = 2k7-there`s a more, we want a symmetrical swing "around" your "O" point (min. distortion)...more horizontal LL is closer to this goal (increasing of the "minimal" Ra=2k7) on the less power "expense"-for more, see this two messages:http://audioroundtable.com/GroupBuild/messages/1111.htmlhttp://audioroundtable.com/GroupBuild/messages/1113.html

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Subject: Trying these for 5K
Posted by Shane on Tue, 05 Sep 2006 22:07:51 GMT
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Here's what I came up with on a couple of lines. Sorry, won't have access to scan till later. This is using Steve Bench's sheets. Picking a 5K OPT since this is what seems to be most commonly used for this amp. Mainly just want to see if I'm getting the math right and understanding a little more of the concept.At 210V/40mA 5K:8 ohm OPT-34V bias voltageVa= 50VVq= 210 VVe= 333VIa= 72mAIb= 54mAIc= 40mAId= 27mAIe= 15mAPo= 2WHD2%=6.25HD3%=1.78HD4%=0.89At 210V/30mA 5K:8 ohm OPT-37V biasVa= 45VVq= 210VVe= 330VIa= 63mAIb= 45mAIc= 30mAId= 16mAIe= 6mAPo=2WHD2%= 7.84HD3%= -0.58HD4%= 1.45

Subject: Re: Trying these for 5K
Posted by Damir on Wed, 06 Sep 2006 11:10:52 GMT
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The simplest way is to draw 5k line on Ua/Ia/Ug diagram, for example through 400V/0mA and 80mA/0V points on X and Y axis (400/0,08=5k).Then you can try various other 5k lines, parallel to the first (preserving the same angles) and various operating points on them.Then you can explore voltage and current "swings", power, linearity, etc.

Subject: Thanks Damir!!
Posted by Shane on Fri, 08 Sep 2006 02:15:34 GMT
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Thanks a heap, Damir!!Heck, I just wanted to be able to draw one (any one) and figure the numbers off of it correctly. Then it's time to actually move the thing into the right place for the "best???" results.I think I'd like to basically stay close to Fred Nachbaur's design except for the PS. Put an actual PT with filtering in the design instead of back-to-back 12V trannies. He doesn't run the tube nearly as hard as Gary does and although I will probably lose some power, the tube will probably last longer not running it at it's limit. I'll have to figure out how to do the bias voltage since he's got it all tied into the two trafos with voltage doublers and things.