Subject: AC filaments
Posted by PakProtector on Thu, 14 Apr 2005 12:25:51 GMT
View Forum Message <> Reply to Message

Hey-Hey!!!,So what happens when...When the grid goes positive to the cathode, its impedance drops and grid current flows...simple enough.What about AC filaments? the whole thing isn't at the same potential, and it is changing. Part of the filament can go negative to the grid at any given time. How much of the cathode/filament can be negative to the grid before the grid impedance starts to change?Like the 20vac Russian filaments? seems like there can be a large area of filament negative to the grid(which is unipotential) at any given time...regards,Douglas

Subject: Re: AC filaments
Posted by Steve on Thu, 14 Apr 2005 17:33:49 GMT
View Forum Message <> Reply to Message

Good question Doug. Actually, virtually none. Grid current can start to flow when the grid is 0, or even a tenth or possibly a few tenths negative with respect to the cathode/filament. Alot depends on the tube condition. And only a very smallest part of the cathode/fil needs to be in this condition. Thus most of the cathode can be positive with respect to the grid and if a sliver of the cathode is near zero vs the grid, current will start to flow. The input Z will start to fall relatively rapidly. Of course, having an AC current will mean that the fil/cathode could be negative with respect to the grid during only a portion of the 60hz cycle. So the input Z could swing from near infinite to low during each 60hz cycle.Take care and hope this helps Doug.Steve

Subject: Re: AC filaments
Posted by PakProtector on Thu, 14 Apr 2005 20:36:01 GMT
View Forum Message <> Reply to Message

This is what I suspected. It does not account for the behaviour of RC coupled amps using the GM70. 4-600 V of B+ and reasonable disipation leave a lot of the available bias taken up by the 20vac filament. Yet they seem to survive and sound good, not to mention put out power like they had unipotential cathodes and could use all the bias V...So, now I have been left teh problem of computing the g1 Z and see what the curve looks like. regards,Dogulas

Subject: It's not that hard to calculate.
Posted by Mark Kelly on Fri, 15 Apr 2005 00:04:37 GMT
View Forum Message <> Reply to Message

As you said, only part of the filament goes negative WRT grid because the heater voltage is applied along the filament. The voltage drop along the filament can be taken to be linear so the sum of grid current potential will be the area under a triangular section "north" of the crossing point.The actual grid current will vary according to k. SQRT (Eg / Ep) for Eg , Ep, then k .(Eg / Ep)^2 for Eg > Ep (logically at the inflection point Eg = Ep the current is k. Eg / Ep which is the convenient point at which to calculate k). Assuming you stay with grid voltage below plate voltage the grid current will be an integral over the square root function derived from the above.The calculation is left to the reader as an exercise (don't you hate that in EE texts?)

Subject: Ha!
Posted by PakProtector on Fri, 15 Apr 2005 01:31:47 GMT
View Forum Message <> Reply to Message

I think that that was one of Feynman's favourite sayings. The Lectures on Physics have that sort of thing in them all over the place.not w/o value I must say. ME texts have the same sort of thing. Too much tenured proff authors for the most part. One must use that sort of exercise sparingly or *VERY* skillfully.Let me fire up my old TI89 and I'll see what this thing actually looks like. And then maybe I'll measure it to test both me and the theory.regards,Douglas

---