

calculation of the output transformer at toroid TX36/23/15-4C65 Ferroxcube and the compensation of the EC81 at cathode-base-circuit

- `reset():digits:=16:Rl:=50:Al:=170e-9:fm:=1e6:fu:=10e3:`

Output impedance R_{i1} -j/w C_{i1} of the EC81 at f_m -area at 1 MHz from LTspice at operation point

- `Zi1:=1816.93-I*32.0518;`

$$1816.93 - 32.0518 \cdot i$$

C_{i1} in nF, that is serial connection of R_{i1} and C_{i1}

- `Ci1:=float(1/(2*PI*fm*abs(Im(Zi1)))):Ci1/1e-9;`

$$4.965553981$$

calculation of R_i parallel C_{in} , parallel connection

- `Ri:=abs(Zi1)^2/Re(Zi1);Cin:=float(1/(2*PI*fm*abs(Zi1)^2/abs(Im(Zi1))));`

$$1817.495414$$

$$1.544760075 \cdot 10^{-12}$$

\ddot{u}^2 for the transformer

- `ueq:=abs(Zi1)/Rl;`

$$36.3442537$$

HP 1. order from R_i and L_g for main inductance -3.01 dB at 10 kHz

this is the necessary main inductance of the complete transformer for $f_u=10$ kHz

- `Lg:=float(abs(Zi1)/2/PI/fu);`

$$0.02892183815$$

calculated L_1 from $L_g=L_1+L_2+2*k*\sqrt{L_1*L_2}$ with $L_2=L_1/\ddot{u}^2$ and $k=1$

- `delete L1:L1:=solve(L1+L1/ueq+2*sqrt(L1^2/ueq)-Lg,L1):L1:=op(L1,1);`

$$0.02127754777$$

chosen coil n_1

- `n1:=ceil(sqrt(L1/Al))+1;`

$$355$$

- `L1:=n1^2*Al;`

$$0.02142425$$

L_2 , transformation on R_l

- `L2:=L1/ueq;`

0.0005894810821

coil n2

- `n2:=ceil(sqrt(L2/A1))+1;`
60

transformed to output

- `Z2:=float(Zi1/ueq);abs(Z2);`
49.99222201 – 0.8818945703 · i
50.0

secondary compensation L3 in nH

- `L3:=float((abs(Im(Z2))/2/PI/fm):L3/1e-9;`
140.3578801

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