

calculation of the output transformer at toroid TX36/23/15-4C65 from Ferroxcube and the compensation of the 6CW4 Nuvistor 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 6CW4 at fm-area at 1 MHz from LTspice at operation point

- `Zi1:=1577.25276-I*22.8035;`

$$1577.25276 - 22.8035 \cdot i$$

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;`

$$6.97940856$$

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))));`

$$1577.582447$$

$$1.45857337 \cdot 10^{-12}$$

\ddot{u}^2 for the transformer

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

$$31.5483519$$

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);`

$$0.02510538075$$

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);`

$$0.01809041496$$

chosen coil n_1

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

$$328$$

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

$$0.01828928$$

L_2 , transformation on R_l

- `L2:=L1/ueq;`

$$0.000579722201$$

coil n_2

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

transformed to output

- `Z2:=float(Zi1/ueq);abs(Z2);`
49.99477517 – 0.7228111337 · i
50.0

secondary compensation L3 in nH

- `L3:=float((abs(Im(Z2))/2/PI/fm):L3/1e-9;`
115.0389648

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