ARMATURE DESIGN OF DC MACHINE-WAVE WINDING

**CODE:**

clc

P=((25\*746)/1000);%in kW v=500;

p=4; N=600; n=N/60;

eff=0.82; si=0.67; Bav=0.55; ac=17000;

Co=(pi^2)\*Bav\*(ac/1000); x=Co\*n;

Mac\_type=input('if generator enter 1 otherwise 0, Mac\_type: '); if(Mac\_type==1)

Pa=(P/eff); else Pa=(P);

end

%calc D and L x=(Co\*n);

D\_L = Pa./x; disp(D\_L)

LD\_ratio = si\*(pi/p);

D = ((D\_L)/LD\_ratio).^(1/3) L = LD\_ratio\*D

%type of winding Ia=(Pa\*1000)/(v\*eff);%in watts fprintf('Armature Current=%.2fA\n',Ia); Ia1=round(Ia);

if (Ia1<400)

disp('Wave winding') winding=1;

else

disp('lap winding') winding=0;

end

%calc no.of armature conductors

p\_pi=Bav\*pi\*D\*L;

E=v;

if (winding==1) A=2;

else A=p;

end fprintf('A=%d\n',A);

Z=((E\*60\*A)/(p\_pi\*N)); Z=round(Z);

fprintf('No.of armature conductors:%d\n',Z);

%calc no.of armature slots Sa1=round(pi\*D\*100/3.5);disp(Sa1); Sa2=round(pi\*D\*100/2.5);disp(Sa2); Sa3=9\*p;;disp(Sa3); Sa4=16\*p;;disp(Sa4); r1=max(Sa1,Sa3); r2=min(Sa2,Sa4);

fprintf('No.of slots ranges from %d to %d\n',r1,r2);

pole\_pair=p/2;

fprintf('Pole pair=%d\n',pole\_pair);

slots=0; for i=r1:r2

if mod(i,2)==1 disp(i) w\_w=(0.67\*i/p);

w\_w=round(w\_w,1); if mod(w\_w,1)==0.5

slots=i;

fprintf('Valid slot: %d (w\_w = %.2f)\n', slots, w\_w); break;

end end

end

if slots == 0

error('No valid slots found in the given range.'); else

fprintf('Final selected slots: %d\n', slots); end

% winding suitability zss=round(Z/slots); if mod(zss,2)==1

zss=zss-1;

fprintf('Conductors per slot=%d\n',zss); end

% slot loading slot\_loading=round(Ia\*zss/A); if (slot\_loading<1500)

fprintf('Slot loading=%dA\n',slot\_loading); disp('Slot loading is less than 1500 A');

else

disp("Slot loading is not less than 1500 A"); end

% Minimum no of armature coils c\_min=round(v\*p/15); fprintf('C\_min=%d\n',c\_min);

% No of armamture coils for i=2:2:10

c=(slots\*i/2); if (c>c\_min)

coil\_sides=i;

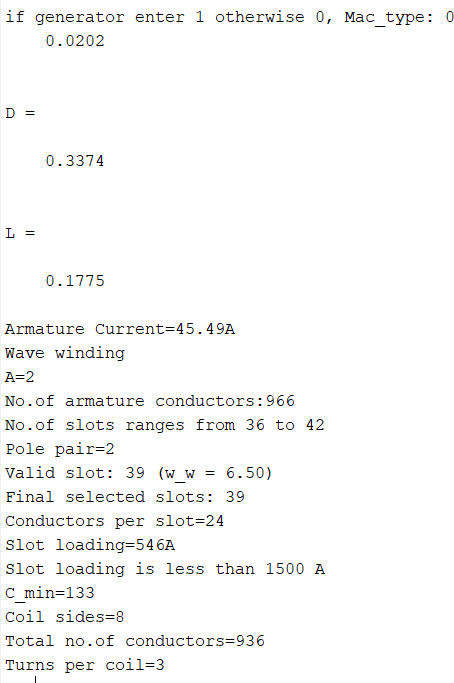
fprintf('Coil sides=%d\n',coil\_sides); break;

end end

%turns per coil Tc ztotal=zss\*slots; Tc=(ztotal/(2\*c));

fprintf('Total no.of conductors=%d\n',ztotal); fprintf('Turns per coil=%d\n',Tc);

**OUTPUT:**

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