Program for Design of Spur Gear, Problem 1.

Problem Statement:A pair of straight teeth spur gear is to transmit 20 kW when pinion rotates at 300 rpm. The velocity ratio is 3:1. The allowable stress for pinion and gear materials are 120 MPa and 100 MPa respectively. The pinion has 15 teeth and its face width is 10 times the module.

Determine:

a) Module

b) Face width

c) PCD of gears from stnadpoint of strength only

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clc;

clear all;

Intializing the known variables:

P=20;

N1=300;

vr=3;

S\_d1=120;

S\_d2=100;

z1=15;

z2=vr\*z1;

k=10;

Finding the lewis form factor:

[y1]=Lewis(z2)

[y2]=Lewis(z2)

Finding the strength factor to decide what the design is based on:

if S\_d1\*y1<S\_d2\*y2

disp("Design is based on pinion")

S\_d=S\_d1;

Y=pi\*y1;

z=z1;

else

disp("Design is based on gear")

S\_d=S\_d2;

Y=pi\*y2;

z=z2;

end

To find the module value and the face width(b) :

syms m

d1=z1\*m;

v=(pi\*d1\*N1)/(60\*1000)

Cv=3/(3+v)

Mt=(9.55e6\*P)/N1

x=vpasolve(((2\*Mt)/(S\_d\*Cv\*k\*Y\*z))==(m^3) , m);

m=x(1);

[m\_n] = Table\_12\_2(m)

b = k\*m

Finding the PCD of pinion and gear respectively:

m\*z1

m\*z2