
# KDOM Project

## PART B : Q1

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# Given information:

Write a computer program (in Matlab/Octave or Geogebra) which accepts the following inputs:

(a) **Pitch circle of the gear**

(b) **Pressure angle of the teeth**

(c) **Number of gear teeth**

Using **AGMA**(American Gears Manufacturer's Association) standards and the data input above, generate the complete geometry of the gear (in the form of a figure showing all the teeth).

For Bonus Credit: Correct the Mechanica logo (for the gear tooth profile).

# Equation of Involute :

$$r = R\sqrt{1+\theta^2}$$

$$y = R\sqrt{1+\theta^2}cos(\beta)$$

$$x = R\sqrt{1+\theta^2}sin(\beta)$$

where ,

$$\beta = \theta - tan^{-1}(\theta)$$

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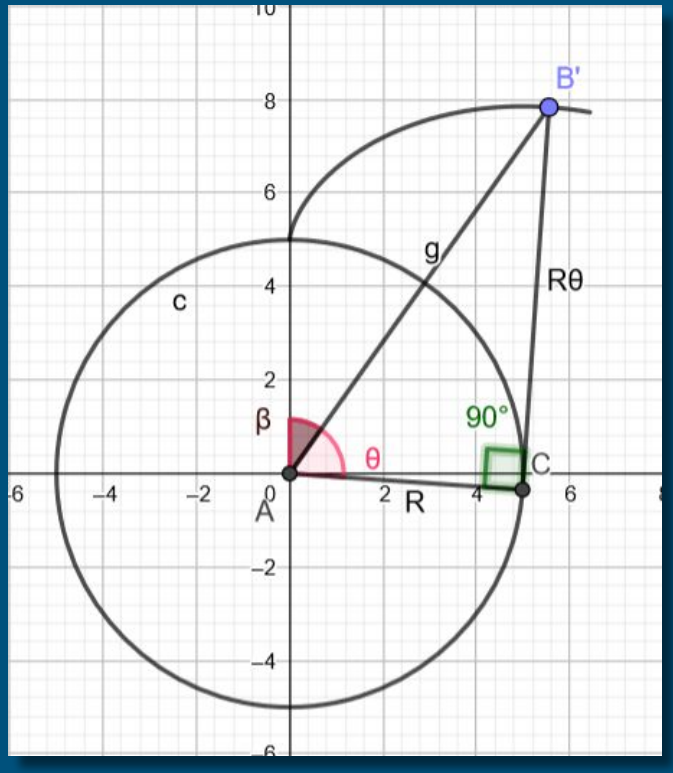
Geogebra Link for the involute profile :

https://www.geogebra.org/classic/yuqgbq6v



# When Radius of dedendum circle is greater than Radius of base circle :

- Calculate the angular distances where the distance of a point on the involute from the center becomes:
  - Rd = $\alpha$
  - Rp = $\beta$
  - Ra = $\gamma$

  Between alpha and beta, draw a circular arc of radius Rd, then between beta and gamma, draw part of involute curve that begins from Rb at an angular distance of 0

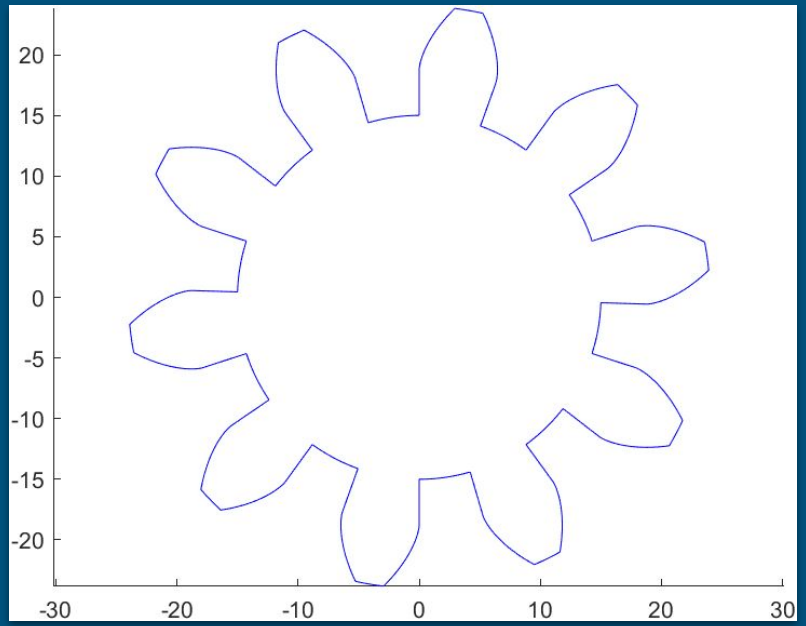
- The return path of the tooth should have an involute of circle with radius Rb with a different starting point
- This starting point will be at an angular distance ct (angle subtended by the circular thickness) + 2 x beta
- Using this information, we can repeat the same process for the return part also.

## When Radius of dedendum circle is lesser than Radius of base circle :

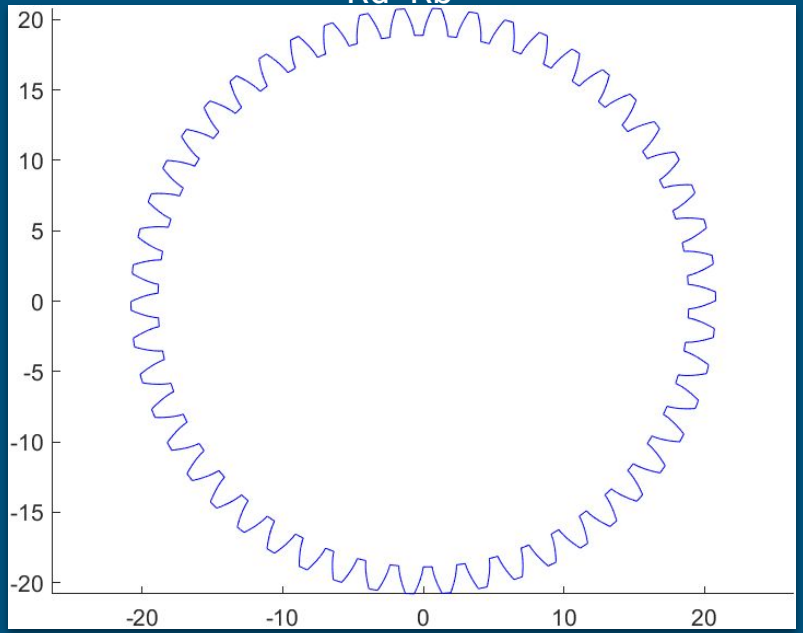
- In this case, we need to draw an involute of base circle from angular distance of 0 to gamma.
- In addition to this we have to radially extend the starting point of the involute to the base circle.

# Gear profile:

Rd<=Rb

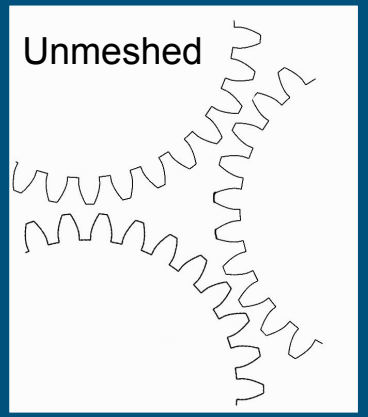


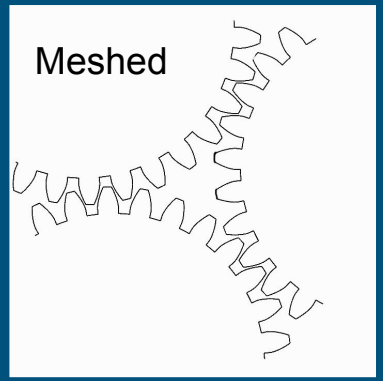

Rd>Rb




Matlab code link:
https://drive.google.com/file/d/1g64d_541lqo_uMtvQGWh1mD4Bp2OgO60/view?usp=sharing

# Correcting the Mechanica logo:




(using gear generated by Matlab code, 30 teeth)