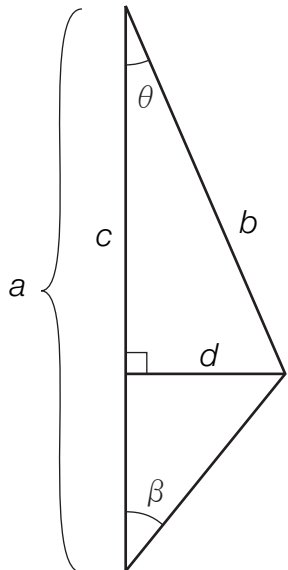
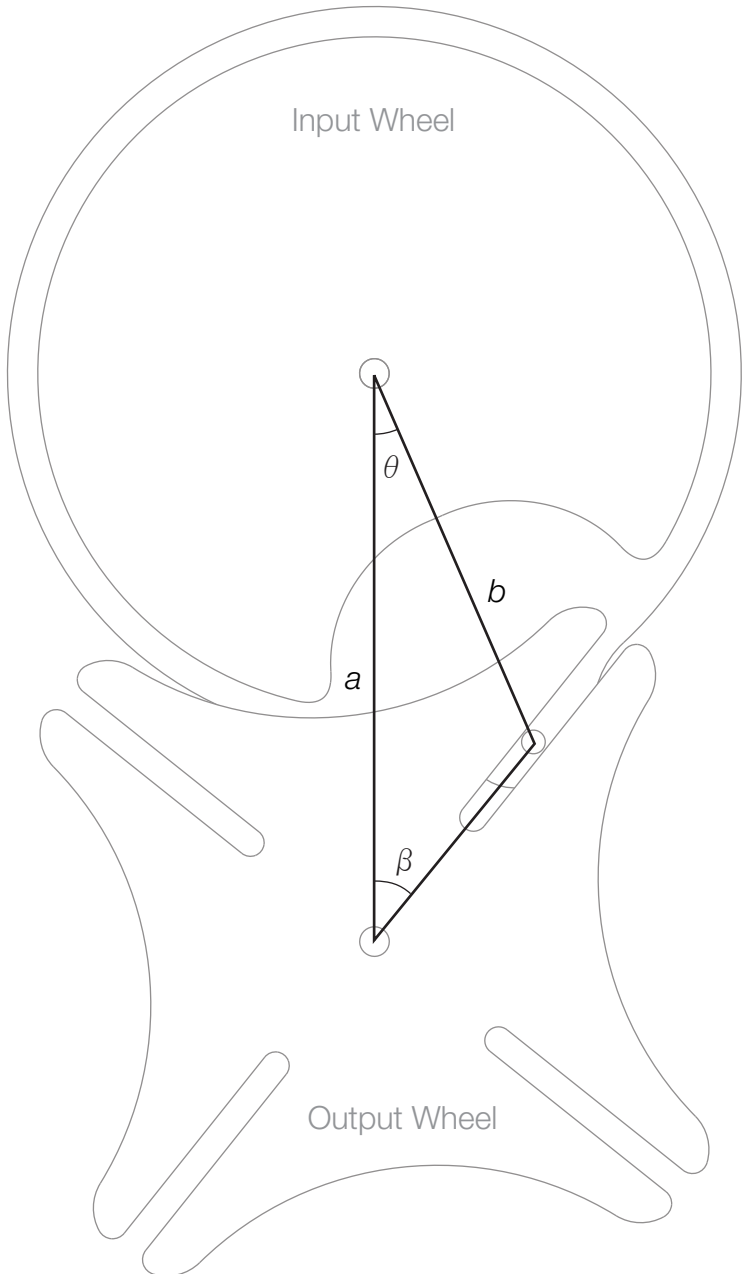
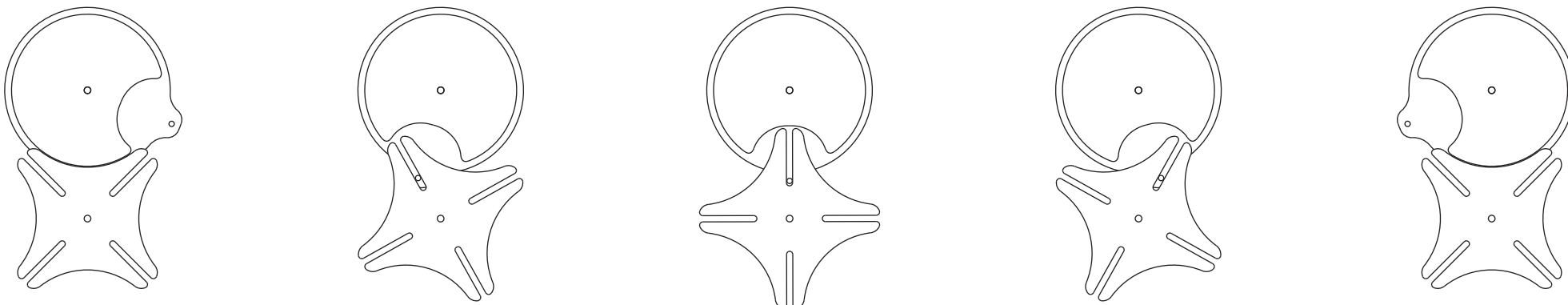


Geneva Wheel Math

objective: Generate an expression that determines the rotation amount of the Geneva's Output Wheel based on the rotation of the Input Wheel as the Input Wheel's pin passes through the Output Wheel's slot.



Known:

a : the distance from the Input Wheel's pivot to the Output Wheel's pivot

b : the distance from the Input Wheel's pivot to its pin

θ : the Input Wheel's angle

Law of sines:

$$\sin \theta = \frac{d}{b} \quad \longrightarrow \quad \text{Solve for } d. \quad \longrightarrow \quad d = b \sin \theta$$

$$\cos \theta = \frac{c}{b} \quad \longrightarrow \quad \text{Solve for } c. \quad \longrightarrow \quad c = b \cos \theta$$

$$\tan \beta = \frac{d}{a-c} \quad \longrightarrow \quad \text{Substitute for } d \text{ and } c. \quad \longrightarrow \quad \tan \beta = \frac{b \sin \theta}{a - b \cos \theta}$$

$$\beta = \tan^{-1} \left(\frac{b \sin \theta}{a - b \cos \theta} \right)$$