Homework 4

A cam system is shown in the figure, in which the cam rotates with a clockwise angular velocity of $\omega \sim N(6, 0.2^2)$ rad/s at the instant $\theta = \dfrac{\pi}{3}$. The surface of the cam has a shape of a limacon defined by $r = (190 + 80\cos\theta)$ mm. Determine the distribution of the velocity of the follower rod AB. If the allowable velocity of AB is $v_a = 470$ mm/s, find the probability of failure of the system. Assume that ω and v_a are independent.

(**Ans.** $p_f = 4.4398 \times 10^{-5}$)