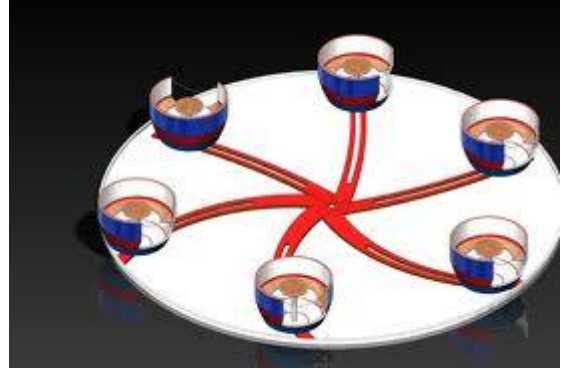


Group Design Project

Consider the “tea-cup” amusement park ride shown. Each cup has an occupancy limit of three riders. The cups are rotated with respect to the platform by the application of torque from the riders. The platform itself is turned by a large electric motor. Use your knowledge of dynamics to address the following issues where it is desired that the sustained acceleration of a rider be less than $3g$ and the peak acceleration experienced by a rider be less than $5g$. You may assume that $g = 10 \text{ m/s}^2$.



- Recommend the maximum constant angular speed (ω_p) with which the platform should be allowed to rotate.
- Recommend the maximum instantaneous angular acceleration (α_p) with which the platform should be allowed to rotate.
- Determine the amount of torque required by the electric motor driving the platform considering your previous two recommendations (requirements).
- Generate a numerical simulation of the accelerations (forces) experienced by a rider on the tea-cup ride. State your assumptions and explain how the results of this simulation may be helpful to a ride designer.

Note: There may be information that you need to complete your design which you do not have. Explain how you would obtain estimates of any missing information that you need.