Homework H.3.F

Given: A shaft is rotating at a constant rate of Ω about a fixed axis. A disk of radius R is able to roll without slipping in a slot that is cut longitudinally into the shaft. The position of the disk's center A is controlled by an hydraulic cylinder that is extending at a constant rate of $\dot{d}$. Consider a set of coordinate axes xyz that are attached to the disk, and a set of coordinate axes XYZ that are fixed in space.

Find: For this problem,

(a) determine the angular velocity and angular acceleration of the disk.

(b) determine the acceleration of point B on the perimeter of the disk at a time when B is immediately to the right of A, as shown in the figure.