

ROTATIONAL EQUILIBRIUM/TORQUE

Unit 15 Dr John P. Cise,

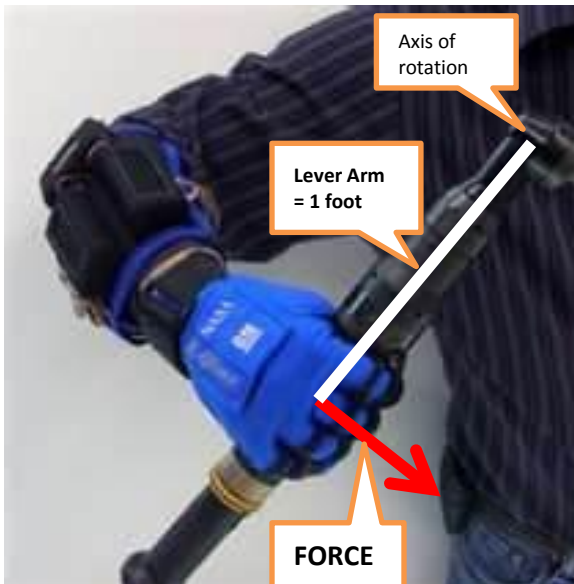
Professor of Physics, Austin Community College, 1212 Rio Grande St., Austin Tx 78701 jpcise@austinctc.edu

& NYTimes March 18,2012 by Paul Stenquist . Please send a e-mail on how you used this application. Thanks! Dr Cise

THE BLOG; G.M. and NASA Design the Robo-Glove

GENERAL MOTORS has retrained its focus on technology destined for outer space. Those awaiting the world's first galaxy-hopping private aircraft, however, may be disappointed. The company's current space mission is focused on the design of a robotic glove that would assist astronauts and down-to-earth workers on G.M. assembly lines. Working with NASA to develop the device, G.M. said in a news release Tuesday that the glove would help autoworkers and astronauts perform their jobs with lowered risk of repetitive-task stress injuries. This isn't the first collaborative effort between the automaker and the space administration. They worked together to develop Robonaut 2, an android that is on the International Space Station, and they co-developed a navigation system for America's trip to the moon and the Lunar Rover Vehicle. Though the Robo-Glove, or K-Glove, as the prototype is internally known, may not be as striking as a moon rover, it may have the most immediate utility. Based on the robotic hand of Robonaut 2, the glove uses sensors, actuators and tendons that mimic the nerves, muscles and tendons of a human hand.

"When fully developed, the **Robo-Glove has the potential to reduce the amount of force that an autoworker would need to exert when operating a tool for an extended time or with repetitive motions,**" Dana Komin, a G.M. manufacturing engineering director, said in the news release. She added that G.M. hoped to bring the technology to the shop floor eventually. **The glove would provide a muscle-assisting boost to reduce a given workload. A task that might require a worker to apply 15 to 20 pounds of force without the glove could be performed with only 5 to 10 pounds of force.**



QUESTION: (a) Find torques without robo-glove?

(b) Find torques needed with robo-glove?