	Samaneh Khorsandi: B.Sc : Robotic. Hamedan University of Technology M.Sc: Mechatronic . K.N.Toosi University of Technology
B.Sc . Thesis Title :	Simulation & Control of a Spherical Mobile Robot
M.Sc. Thesis Title:	Modeling and Control of the Spherical Mobile Robot Based on Barycenter offset
Research Interest:	- Design and Control of Robotic System - Dynamic and Control of Manipulators and Mobile Robot - Mechatronics System - fuzzy Control

Abstract:

A spherical robot is a mobile robot which consisted of a spherical shell and an inside driving unit. The driving unit causes the robot to move by rolling the spherical shell on surfaces. Since a spherical shell never overturns, instability will not be an issue anymore.

In this thesis, a spherical mobile robot with a new inside driving unit is presented. This IDU has two degrees of freedom and moves the spherical shell in two orthogonal directions by changing the center of mass or barycenter offset. This is the very first robot which has deployed the idea of space bar mechanisms. Compared to the other similar systems, a spherical robot has some advantages including non-sliding of driving unit along the spherical shell, providing the maximum torque for moving the sphere, simple design and decoupled controllers for two positions on the plane.

The goal is to control the position of the center of mass. This robot has a nonlinear system and non-holonomic constraint. After designing the model in SOLIDWORKS, the dynamic analysis and feasibility move is performed by ADAMS software. Then, after extracting the robot dynamics, the ADAMS model is validated by dynamic equations. By co-simulation in ADAMS and MATLAB softwares, the controllers were designed in order to control the robot in a plane.

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