CONTROL-CENTRIC SIMULATOR FOR MECHATRONICS DESIGN
Case Study: Gyroscopically Stabilized Single Wheel Robot

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Abstract— A 3-Dimensional simulation platform developed as an aid for designing complex mechatronics system is presented in this paper. It uses ADAMS for simulation with animation of the dynamic behavior of the mechanism whose parts are drawn using a 3-D drawing software e.g., SolidWorks. The overall simulation platform integrates the 3-D simulator ADAMS with control design software MATLAB. This integration allows the designer to adopt a control-centric approach for designing complex mechanical structure to be used in a mechatronics system. Dynamic analysis of single wheel robot is used in this paper as an example to illustrate its uses. The simulating environment can easily be extended to any complex mechanical system simply by altering SolidWorks drawings.