Student Projects

Short descriptions (more info and references by request):

1. Modeling, motion/trajectory planning and controller design **for quadrupeds**. The task is to model the dynamics of a robot (think of a Boston Dynamics BigDog) and search feasible gaits for the model that will be consistent with dynamic and kinematic constraints imposed on the model. The next task is to design feedback controllers that achieve orbital stabilization of the found gaits.

2. Modeling, motion/trajectory planning and controller design **for collaborative work of industrial manipulators.** The task is to model kinematics and dynamics of two different industrial manipulators (ABB IRB140 and ABB IRB 1600) and plan trajectories for handling common objects by both robots.

3. Modeling, motion/trajectory planning and controller design for **Gorilla biped (28 degree of freedom humanoid walking robot** from Fukuda Lab, Nagoya University**).** The task is to search a human-like locomotion patterns for a reduced model of a robot. For a found gait controller design and analysis of robustness to parametric and dynamic uncertainties are to be suggested. See: www.mein.nagoya-u.ac.jp/www_groups/2004/**robot**04/**GorillaRobot**.htm

4. Modeling, motion/trajectory planning and controller design for **two degrees of freedom walking-rolling robot** from Sampei Lab. Tokyo Institute of Technology. The task is to model the robot, search for the gait and design controller for its orbital stabilization. See:
http://www.sc.ctrl.titech.ac.jp/research/nonlinear/RollingAcrobot/RollingAcrobot-e.html