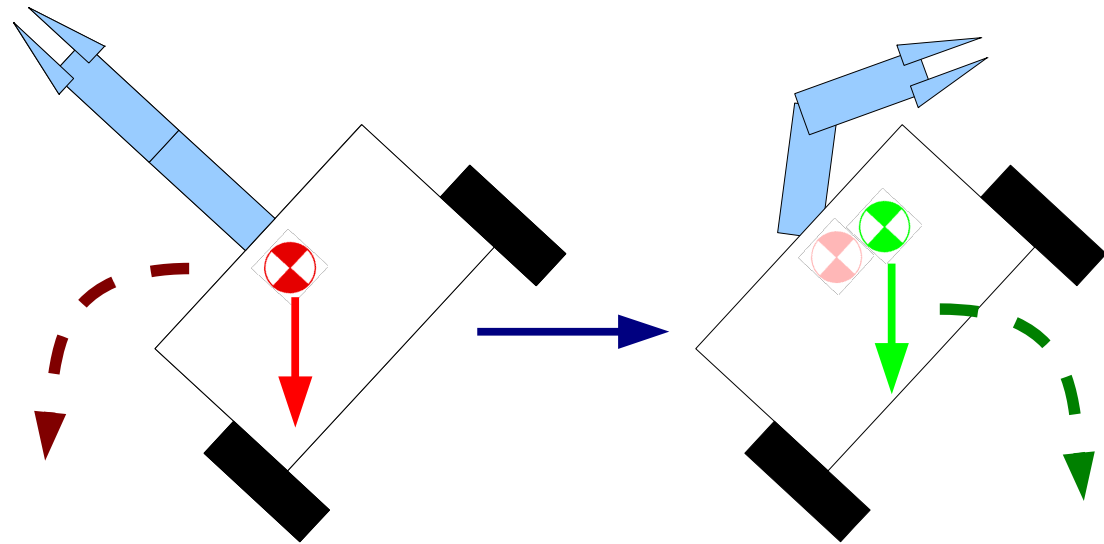


# Stability Control of a Teleoperated Mobile Robot via Manipulator Arm Dynamic Weight Shifting

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**High-speed RC cars have a tendency to flip.  
Robots can have similar problems.**



**Moving a robot's arm can change the CoM to  
prevent rollover!**

Current teleoperated mobile robot systems often perform tasks at such a slow pace that the dynamics of the robot motion can often be ignored and the system can be treated as quasi-static. For robots to become more useful tools for humans in the future, the speed at which robot-assisted tasks can be completed must be increased. However, wheeled robots can become unstable and roll over when taking sharp turns at high speeds. Dynamic weight shifting has previously been used to change the center of mass of a robot to increase stability and performance during teleoperation, but a dedicated system for this purpose adds weight and complexity to the robot. Many teleoperated robots already have manipulator arms mounted on them for various other tasks, which are typically stowed while the robot is driving. The aim of this project is to design and produce a high-speed teleoperated mobile robot system that uses a manipulator arm for dynamic weight shifting during driving to increase stability and prevent rollover during high-speed turns. Students working on this project must have already completed ME360, and prior or concurrent enrollment in a more advanced controls course such as ME461 is recommended.