EE40 Final Project Proposal

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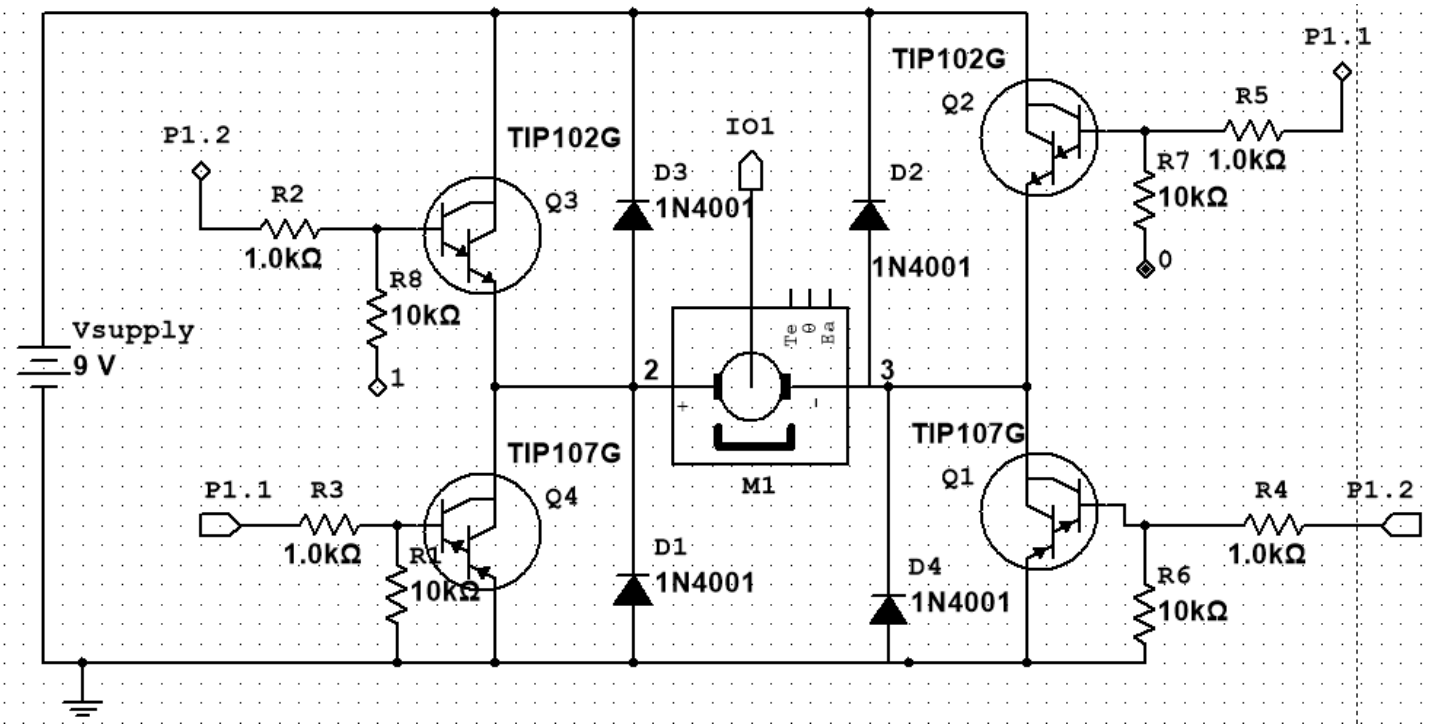
Description

Our robot will be a self-balancing robot that stands on the back two wheels. It will incorporate adding a digital gyroscope/accelerometer, along with a state estimator and digital state PID control system to keep the robot in balance. Additionally, we will incorporate a bluetooth control system to drive and control the robot's systems. Since the robot will have wheels instead of springs to move, we will incorporate the following 2 analog circuits: an H-bridge circuit with a switch to drive the motors backward and forward, and an analog low pass for the output of the accelerometer.

Circuit Schematic

Motor H-Bridge (IO1 is angular velocity of the shaft when there is no load)



Parts list

Part	Link	Price ($)
Wheels	http://www.robotshop.com/en/pololu-wheel-90-10mm-black-pair.html (or similar depending on motor)	$9.95
Bluetooth Chipset/Receiver	http://www.robotshop.com/en/electronic-brick-serial-bluetooth-module.html	$12.60
Digital gyroscope/Analog Accelerometer	MPU6050 (gyro) - http://amzn.com/B008BOPN40 ADXL335 (accel) - http://amzn.com/B00FIJG5I4	$7.67
2x TIP-102 NPN	https://www.fairchildsemi.com/datasheets/TI/TIP102.pdf	$0.00

2x TIP-107 PNP	https://www.fairchildsemi.com/datasheets/TI/TIP105.pdf	$0.00
TOTAL		$30.22

Flow Charts

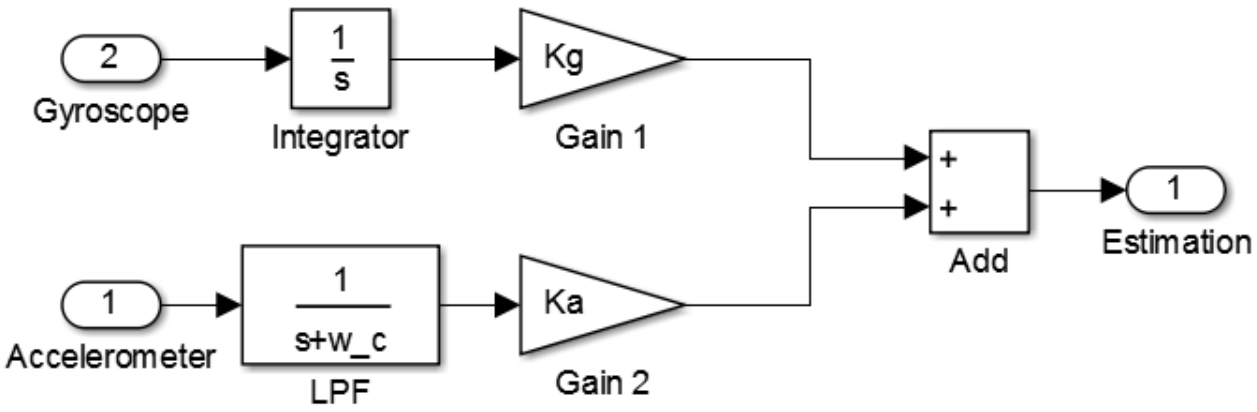


Figure 1: State estimation flow chart

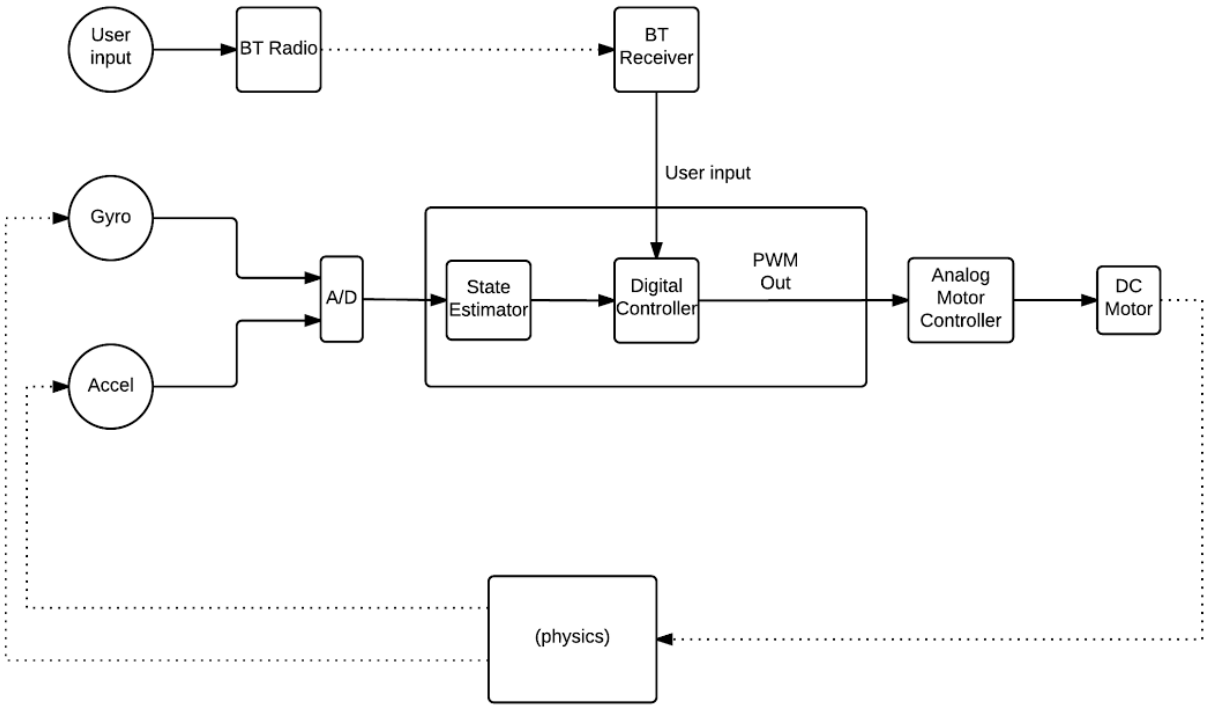


Figure 2: System structure flow chart