Phil’s motor control testing.

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**Scope:**

This testing strategy involves first testing an individual motor under a variety of conditions, and then performing tests on a pair of motors acting together on a robot.

Tests will be performed by a single OpMode utilizing a simple menu to select, run and exit the desired test. Most tests will produce real-time telemetry data while the test is running, but some tests may also produce summary results when the test is complete (eg: results for a range of speeds). Where varied load conditions are required for testing, the user will need to create a mechanical test fixture suitable for the specific motor being tested.

Code for the series of proposed tests is being developed, and is available here: <https://github.com/gearsincorg/test_suite>

Please read the OpMode comments for test specifics. Test Menu Names are included below in parenthesis.

**Areas to be tested:**

The following tests are designed to verify normal operation, as well as highlight problems in typical edge conditions historically found in robot control systems.

1. Open Loop Power (OLP)control
   1. Proportional speed response (OLP\_ProportionalSpeeds)
   2. Braking behavior (OLP\_BreakingBehavior)
   3. Smooth transition from Stop-to-Speed-to-Stop. (OLP\_SmoothTransitions)
   4. Response to rapidly changing Joystick input (OLP\_DynamicSpeedChange)
2. Closed Loop Velocity (CLV) control
   1. Proportional speed response (CLV\_ProportionalSpeeds)
   2. Braking behavior (CLV\_BreakingBehavior)
   3. Smooth transition from Stop-to-Speed-to-Stop. (CLV\_SmoothTransitions)
   4. Response to rapidly changing Joystick input (CLV\_DynamicSpeedChange)
   5. Ability to obtain and hold speed (No Load, varied speeds)
   6. Ability to obtain and hold speed (Varied load, varied speeds)
   7. Predictable response to missing encoder signals
   8. Predictable response to unobtainable commands
   9. Predictable response to reversed motor polarity
3. Closed Loop Position (CLP) control.
   1. Smooth transitions into and out of Closed Loop Position
   2. Ability to hold position (no load)
   3. Ability to hold position (Varied symmetrical loads)
   4. Ability to hold position (Varied asymmetrical loads)
   5. Ability to run to distant position (no load)
   6. Ability to run to distant position (Varied symmetrical loads)
   7. Ability to run to distant position (Varied asymmetrical loads)