

Lab 7: DC Motor Configurations
Performed: March 11, 2013
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Abstract

In this experiment, the effect of a DC motor's construction on its torque-speed relationship (also referred to as its terminal characteristics) was examined. The three connection types examined here are: series-connected, shunt-connected, and compound-connected (a combination of the two).

Results

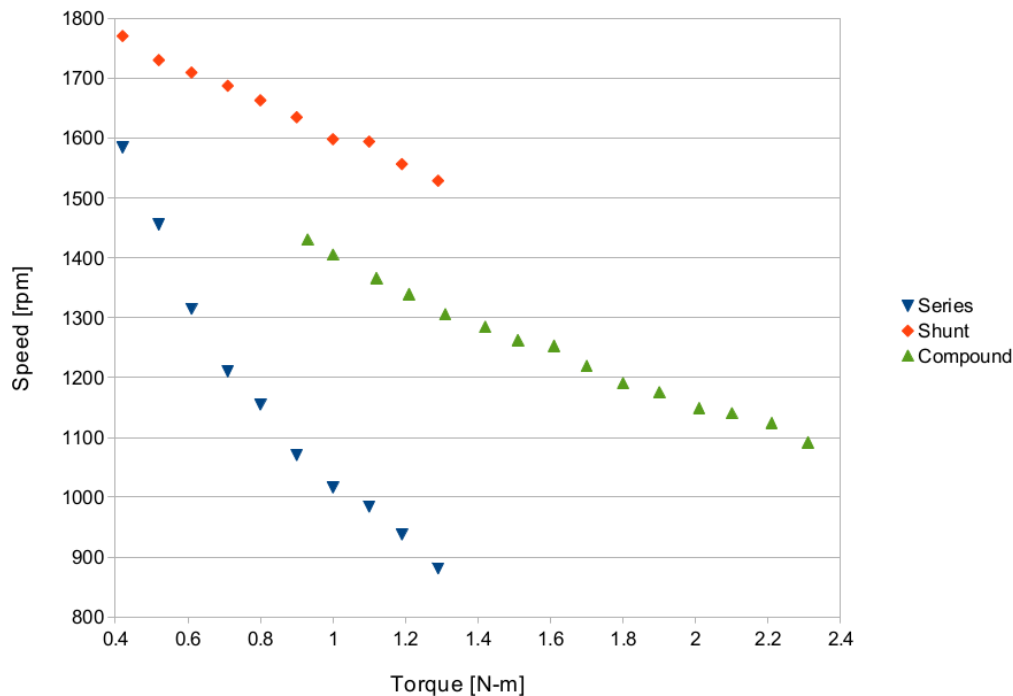


Figure 1: Comparison of Torque-Speed relationships for each construction

Conclusions

The torque-speed relationship, or terminal characteristics, of the shunt motor resembles a straight line. In fact, the equation for a shunt motor's torque-speed relationship is linear, with a negative slope. The terminal characteristics of a series motor are nonlinear. It is noted that as the torque on a series motor goes to zero, its speed goes to infinity. However, the torque on a motor can never go to zero because of the mechanical, core, and stray losses that must be overcome. Just as well, the speed of a series motor can still turn fast enough to damage itself. The terminal characteristics of a cumulatively compounded motor resemble both a series and a shunt motor. This is because the compounded motor contains both a shunt and a series field. Although the resemblance is hard to discern from Figure 1, if more data was obtained, it would be apparent that the motor resembles a shunt motor at low torques, and a series motor at higher torque.