

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

In this experiment, the effect of a motor's construction on the torque-speed relationship was examined.

## Results

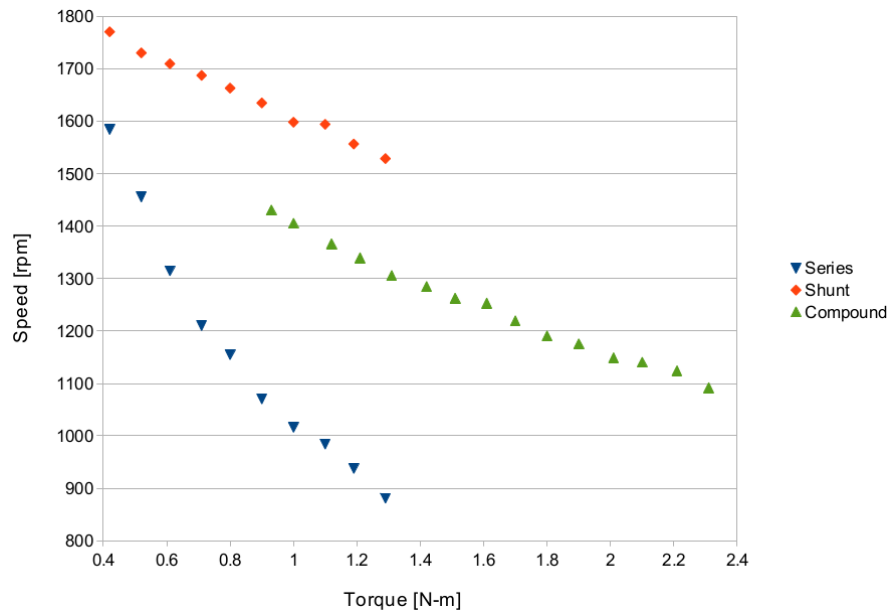


Figure 1: Comparison of Torque-Speed relationships for each construction

## 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 speed  $v_{\text{torque}}$  is a linear relationship with a negative slope. The terminal characteristics of a series motor have a nonlinear relationship. 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, then at low torque, the compounded motor would most resemble a shunt motor. At higher torque the compounded motor would most resemble a series motor.