Assignment: Design a system that will maintain the speed of a motor at 110 ± 15 RPM. The following information may be helpful in planning your design.

- The speed of the motor, measured in revolutions per minute (RPM), is determined by the voltage applied to the input of the motor. This relationship for the no-load condition is shown in Figure 1.

- The motor contains a tachometer that produces a sinusoidal output with a peak-to-peak voltage proportional to the speed of the motor. This relationship is illustrated by the following equation,
$$RPM = 27.23*(V_{pp}-4).$$

- A digital-to-analog converter outputs a discrete analog voltage that is proportional to the ratio of the input digital count to the maximum number of counts. The maximum output voltage, V_o, depends on the full-scale voltage, V_{fs},
$$V_o = V_{fs}*count/2^n$$
Where n is the number of D/A input bits, and count is the binary value of the input to the D/A converter at a given time. You may assume $V_{fs} = 15.0$ volts and $n=8$.
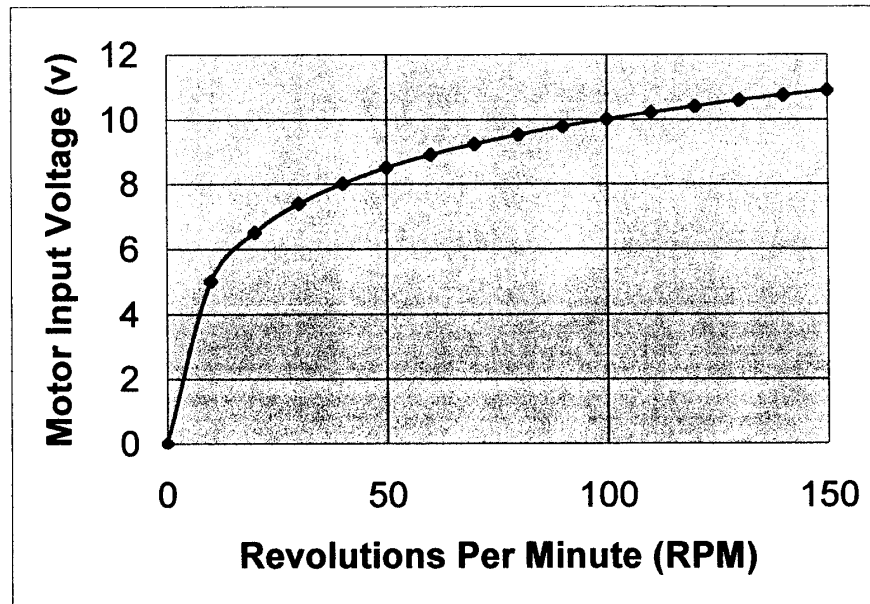

Figure 1: Applied DC Motor Voltage vs. Motor RPM