Text, letter

Description automatically generated

This is the formula for the back-emf voltage; we can use this formula to find the kbemf by plotting Vbemf versus the angular frequency (which was derived by using 1/12th the frequency of the encoder).

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| --- |
|  |
| The slope for this graph corresponds to the kbemf value, which was derived to be 0.0183 V/(rad/s). |
| This equates to the kT value in consistent units. |

This is the formula for the motor torque; we can use this formula to find kT by plotting Tm versus the motor current.

|  |  |  |
| --- | --- | --- |
| kD= | 2.00E-06 | Nm/(rad/s) |
| kC= | 0.0003 | Nm |

These graphs match those derived in the class/lab. The slope of this graph is kD and the y-intercept is kC. Assuming the load torque is zero in this instance and the system is in steady-state conditions , the motor torque is equal to the frictional torque since becomes .