Embedded Systems Coursework 2

Motor Controller Driver

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Velocity control

Velocity control was the simplest deliverable to achieve, and was accomplished using a PID controller, and PWM. This controller took the current (angular) velocity of the motor as input and returned a new delay which could be used to set the duty cycle of the PWM signal sent to the motor.

The PWM signal was set up using the given function xxx(). A thread was set up with the following routine (presented here as pseudocode for clarity) which looped constantly.

PWMthread{

While true{

Turn all coils off

Wait 1-d

Turn desired coil on

Wait d

}

}

This sent a PWM signal to the desired coil, with delay and acive coil being set through shared variables. This thread was set as high priority, since not being updated would stall the motor. We did not use interrupts for it since the controller would adjust for slight inaccuracies, and it would have meant interrupting very frequently, increasing the pre-emption overhead and causing problems for other important processes.

Positional control

Playing a tune

Self-calibration