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Implementing Digital Control System in Robotics

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Abstract : This paper describes the design of a digital control system which controls the speed and direction of a robot. The robot is expected to follow a black thick line with the highest possible speed and lowest error around the line. The control system of the robot will correct for the angle error that is made between the frame axis of the robot and the line. The cause for error is the difference in speed of the two driving wheels of the robot which are driven by two separate DC motors, whereas the speed difference in wheels is due to the un-modeled fraction that is available in the wheels with different magnitudes in each. The control scheme is that a number of photo sensors are mounted in the front of the robot and report their position in reference to the black line to the digital controller. The controller then, evaluates the position error and generates the needed duty cycle for the related wheel motor to drive it faster or slower.

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