An Industry-Standard Benchmark Consortium

AutoBench™ Version 1.1

Benchmark Name: Pulse Width Modulation (PWM)

Benchmark Description

This EEMBC benchmark simulates an application in which an actuator is driven by a PWM signal proportional to some input. Specifically, the algorithm presumes that the embedded processor is driving an H-bridge motor driver with both direction and enable signals. Outputs are provided for two such H-bridge drivers, as might be used for a bipolar stepper motor driver, or proportional DC motor driver.

The stepper motor is controlling the position of the actuator. We can control it by passing a desired position command to the algorithm, and let the algorithm control moving the motor to that position.

On each pass, the algorithm simulates the PWM signals and checks to see if the motor has reached the commanded position once per PWM cycle. By providing the stepper motor with phasing signals as well as PWM control of each phase, the motor can be micro-stepped to provide finer resolution and smoother motion. The phase control provides direction signals for energizing each of the stepper motor coils in a typical bipolar full-step sequence. The algorithm could be used in applications with actuators other than stepper motors, making use of just the PWM feature without the phasing control, in which case the PWM signals would provide proportional velocity control, while the phase signals would provide motor direction.

Optimization Rules

Category	Allowed	Disallowed
ANSI C	X	
Intrinsics/Language Extensions	X	
Custom Libraries	X	
Assembly Language	X	
HW Accelerators	X	

Algorithm Flowchart (page 2)

Algorithm Flowchart