TechNOTE

Title: Velocity profiles – Trapezoidal versus S-curve
Products(s): DCX-AT200, DCX-AT300, DCX-VM200, DCX-VM300
Keywords: Profile, Trapezoidal, S-curve
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Summary

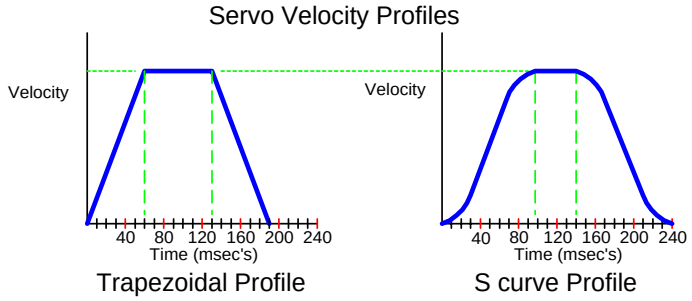
Servo controllers typically offer the machine builder two types of velocity profiles:

Trapezoidal or S-curve

A trapezoidal profile will result in a shorter duration (gets to the target quicker). An S-curve profile, otherwise known as a *controlled acceleration profile*, will take more time to complete, but the *jerk* response at the beginning, ending, and transition points (acceleration to maximum velocity, Maximum velocity to deceleration) are removed.

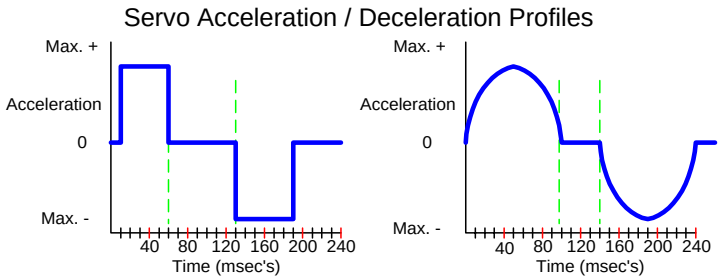
More Information

The graphs below demonstrate the difference of a move executed as a trapezoidal versus S-curve profile. The distance, maximum velocity, acceleration, and deceleration are the same for both graphs.



Trapezoidal Profile S curve Profile

The trapezoidal profile completes in 190 milliseconds. The S-curve profile takes an additional 50 milliseconds to complete the move. As demonstrated by the Acceleration profiles below, trapezoidal profile moves are much more likely to have throughput reduced (due to increased settling time) and mechanical component degradation due to acceleration jerk.



Trapezoidal Profile S curve Profile

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