Stepper motor control background theory

1 Minimum Jerk Trajectory Generation

The boundary conditions are:

	position	velocity	acceleration
t=0	x_0	v_0	a_0
t=T	x_T	v_T	a_T

$$x(t) = c_5 * t^5 + c_4 * t^4 + c_3 * t^3 + c_2 * t^2 + c_1 * t + c_0 \tag{1}$$

$$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 1 \\ T^5 & T^4 & T^3 & T^2 & T & 1 \\ 0 & 0 & 0 & 0 & 1 & 0 \\ 5T^4 & 4T^3 & 3T^2 & 2T & 1 & 0 \\ 0 & 0 & 0 & 2 & 0 & 0 \\ 20T^3 & 12T^2 & 6T & 2 & 0 & 0 \end{bmatrix} \begin{bmatrix} c_5 \\ c_4 \\ c_3 \\ c_2 \\ c_1 \\ c_0 \end{bmatrix} = \begin{bmatrix} x_0 \\ x_T \\ v_0 \\ v_T \\ a_0 \\ a_T \end{bmatrix} \tag{2}$$

$$\begin{cases} c_0 = a_T \\ c_1 = a_0 \\ c_2 = \dfrac{v_T}{2} \end{cases} \tag{3}$$