Command

1 Parameters

- Distance : d
- Time length : t_f
- Short time : $t_s = 0.75 \times t_f$
- Start position : p_{start}
- Current position : $p_{current}$
- Gain : K

Speed function :

$$speed(t) := \frac{a.t^2}{2} + b.t \tag{1}$$

Position function :

$$position(t) := \frac{a.t^3}{6} + \frac{b.t}{2} + p_{start} \tag{2}$$

With :

$$a = -12 \times \frac{d}{{t_s}^3} \ , \ b = 6 \times \frac{d}{{t_s}^2} \tag{3}$$

Command :

$$c = K \times (position(t) - p_{current}) \tag{4}$$

Example :

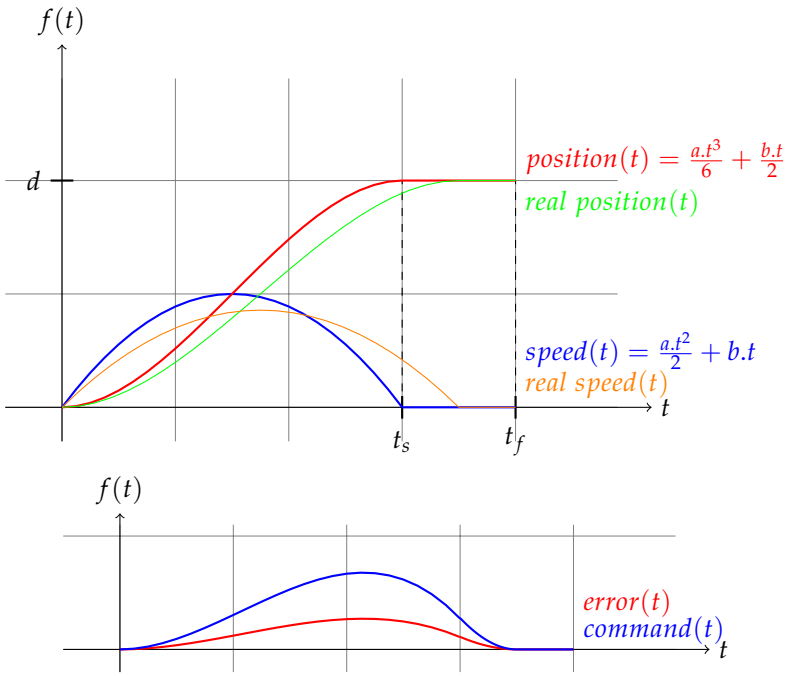

Fig. 1: Example of command for $d = 2$ and $t_f = 4$.

2 Scaling

Scale output in 0-250 range for servo-motor :

1. **output *= -1;** //Change direction
2. **output = output>1?output+val:output;** //Miminum position value
3. **output = output<-1?output-val:output;** //Miminum negative value
4. **output += 125;** //Move the middle line to 125
5. **output = output<0.1?0.1:output>250?250:output;** //Clip to 0.1-250

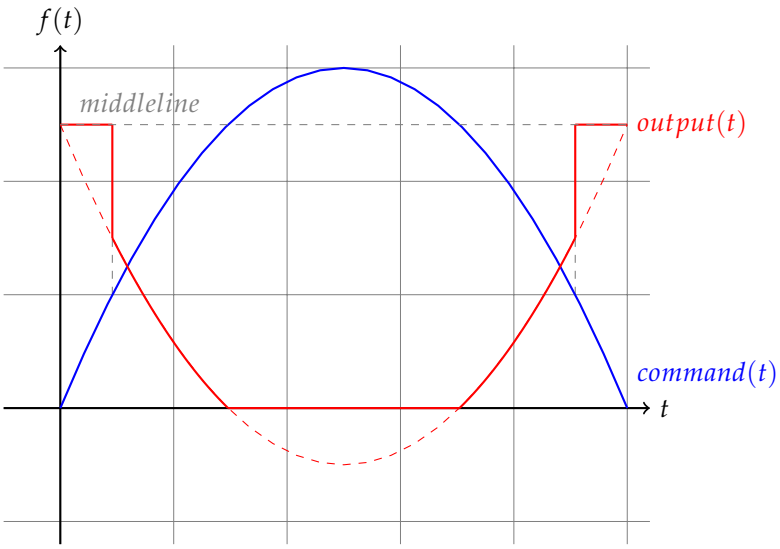

Fig. 2: Example of output, the scale is not respected here.

3 Usage

1. Connect servo-motor to pin PA6
2. Connect encoder to pin PB7
3. Connect board to USB
4. Launch MuscleTalk in VB6
5. Open connection
6. Send 'X1' to active controllers
7. Send 'U1,position,time,gain'
   - position (increments) in [850:1600] range
   - time (ms) in [1:inf[range
   - gain (0 or nothing to display values)