

Excel Case Study: Plot a piecewise continuous function

ME 120

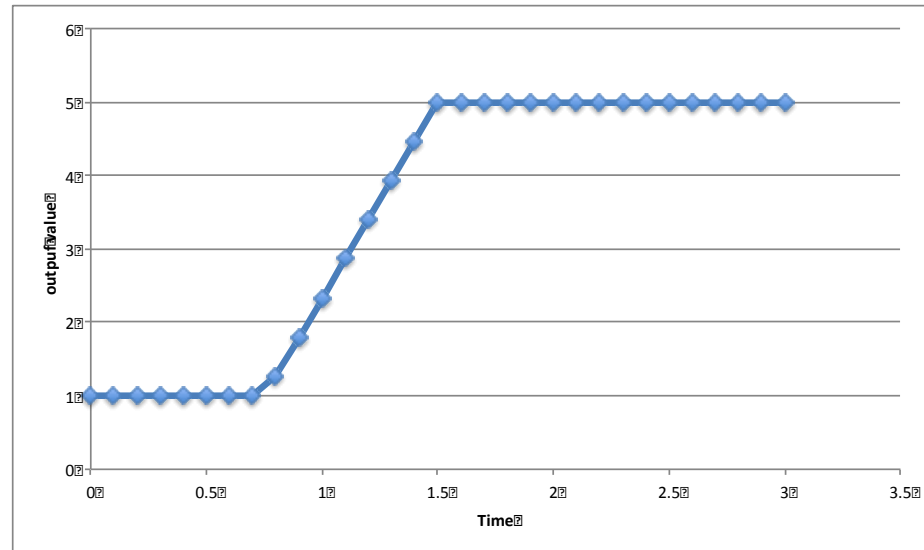
Mechanical and Materials Engineering

Portland State University

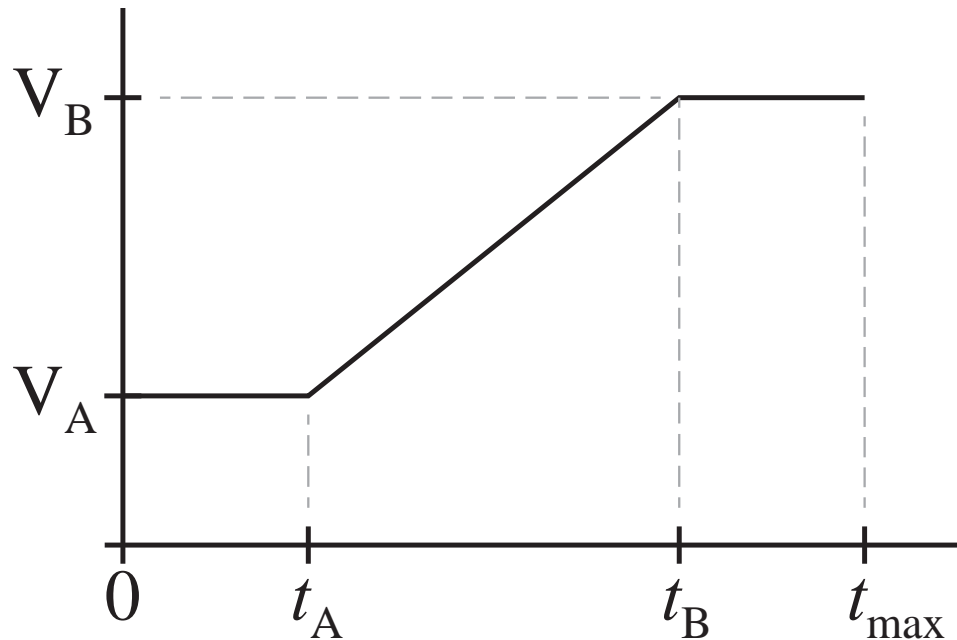
<http://web.cecs.pdx.edu/~me120>

Overview

- Introduce intermediate Excel features
 - ❖ Named cells
 - ❖ “if” function
- Hands-on goal: draw a piecewise continuous function

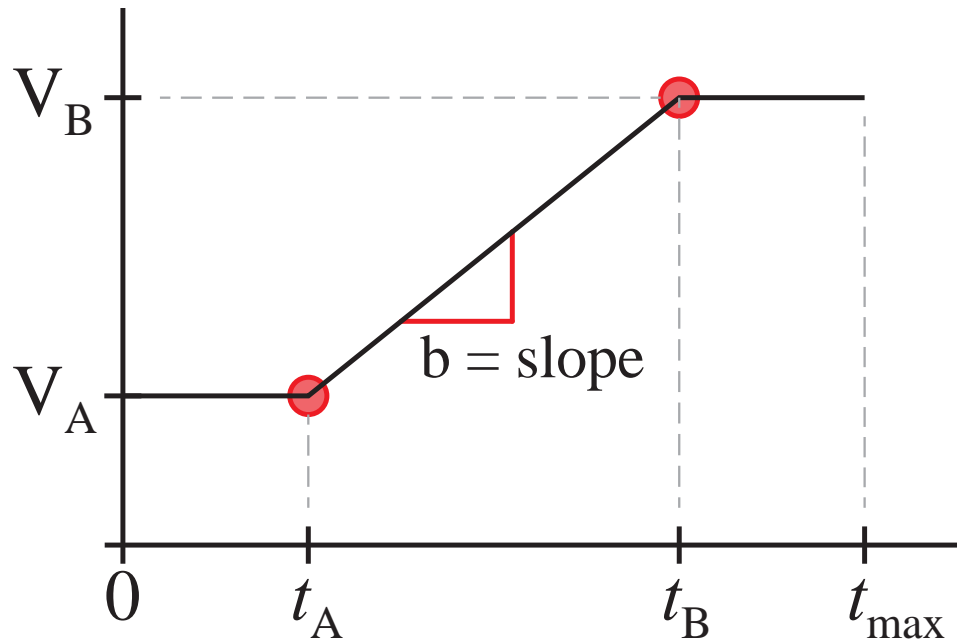


Nomenclature



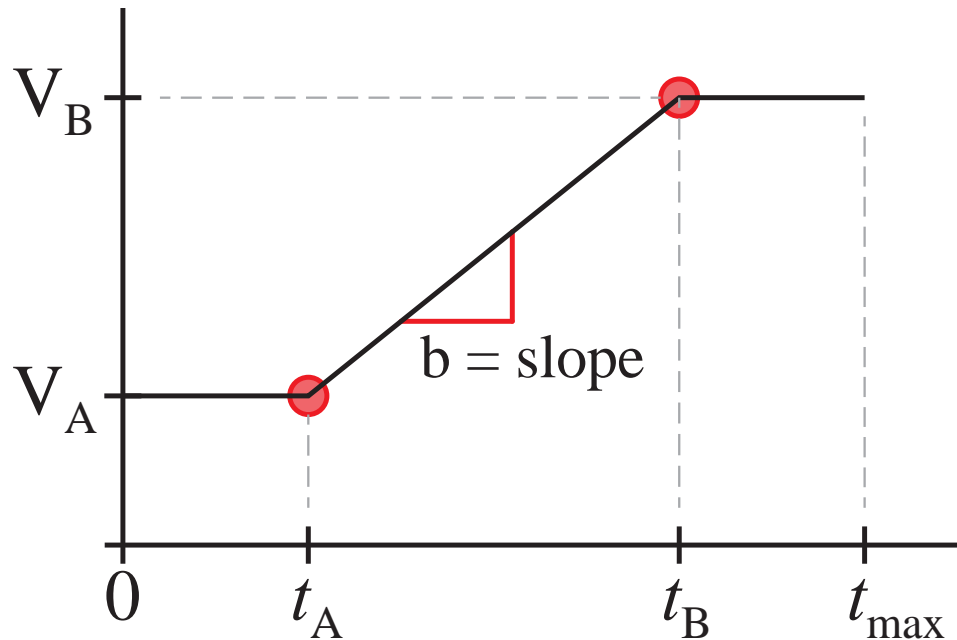
- Call the piecewise function $V(t)$
- Ramp between two levels, V_A and V_B
- Time span defined by four values, 0 , t_A , t_B and t_{\max}

Nomenclature



- We need an equation for $V(t)$ during the ramp
- Use $V(t) = a + bt$
- Match endpoints
 - ❖ $V_A = a + bt_A$
 - ❖ $V_B = a + bt_B$

Nomenclature



Solve for a and b :

$$b = \frac{V_B - V_A}{t_B - t_A} \quad a = V_A - \frac{V_B - V_A}{t_B - t_A} t_A$$

or

$$V(t) = V_A + \frac{V_B - V_A}{t_B - t_A} (t - t_A)$$