

Lab 7 Written Work

Thursday, October 12, 2023 4:03 PM

$p_n(x_j) = a_0 + a_1 x_j + \dots + a_n (x_j)^n = f(x_j)$ } one row equation, but we have n rows

$$\underbrace{\begin{bmatrix} 1 & x_0 & x_0^2 & \dots & x_0^n \\ 1 & x_1 & & & x_1^n \\ 1 & x_2 & & & \\ \vdots & \vdots & & & \\ 1 & x_n & x_n^2 & \dots & x_n^n \end{bmatrix}}_V \text{ (Vandermonde)} \cdot \underbrace{\begin{bmatrix} a_0 \\ a_1 \\ \vdots \\ a_n \end{bmatrix}}_{\bar{a}} = \underbrace{\begin{bmatrix} f(x_0) \\ \vdots \\ f(x_n) \end{bmatrix}}_{\bar{F}}$$

$$\therefore \bar{a} = (V)^{-1} \cdot \bar{F}$$

To interpolate using this method, I would create the vandermonde matrix, invert it, and multiply it by the \bar{F} array as shown above.