

$$\text{numsamples} = 6$$

$$ax^3 + bx^2 + cx + d = y$$

$$\begin{pmatrix} x^3 & x^2 & x & 1 \\ x^3 & x^2 & x & 1 \\ x^3 & x^2 & x & 1 \\ x^3 & x^2 & x & 1 \\ x^3 & x^2 & x & 1 \\ x^3 & x^2 & x & 1 \end{pmatrix} \begin{pmatrix} a \\ b \\ c \\ d \end{pmatrix} = \begin{pmatrix} y_1 \\ y_2 \\ y_3 \\ y_4 \\ y_5 \\ y_6 \end{pmatrix}$$

$$A = \begin{pmatrix} x^3 & x^2 & x & 1 \\ x^3 & x^2 & x & 1 \\ x^3 & x^2 & x & 1 \\ x^3 & x^2 & x & 1 \\ x^3 & x^2 & x & 1 \\ x^3 & x^2 & x & 1 \end{pmatrix}$$

$$(A^T A)^{-1} A^T \begin{pmatrix} y_1 \\ y_2 \\ y_3 \\ y_4 \\ y_5 \\ y_6 \end{pmatrix} = \begin{pmatrix} a \\ b \\ c \\ d \end{pmatrix}$$