

Figure 1: Plot before increase in regularization ($\lambda = 0$)

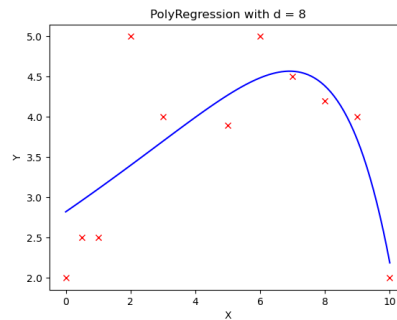


Figure 2: Plot after increase in regularization ($\lambda = 1$)

A3(b)

To analyze the effect of regularization on polynomial regression, we first fit a polynomial of degree $d = 8$ with no regularization ($\lambda = 0$). The resulting plot is shown in Figure 1. Next, we increase the regularization parameter to $\lambda = 1$, which penalizes large coefficients and smooths the curve. The resulting plot is shown in Figure 2. Increasing regularization reduces overfitting, resulting in a smoother function that generalizes better to new data points.