

Question 3

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1 Part A

Use the following models to estimate the mean function of the data:

Cubic splines (use 8 knots):

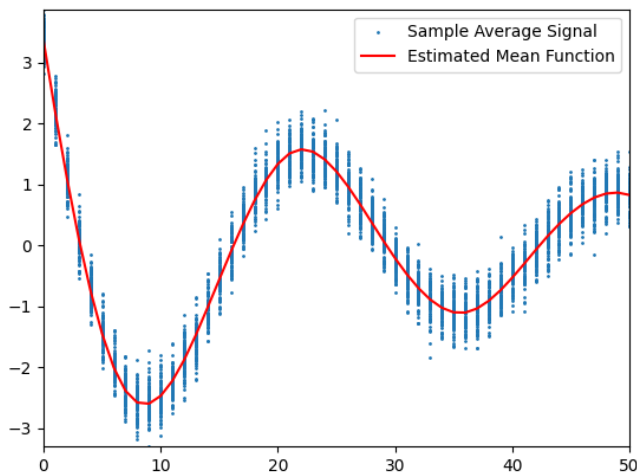


Figure 1: Cubic Spline Mean Function

B-splines (use 8 knots):

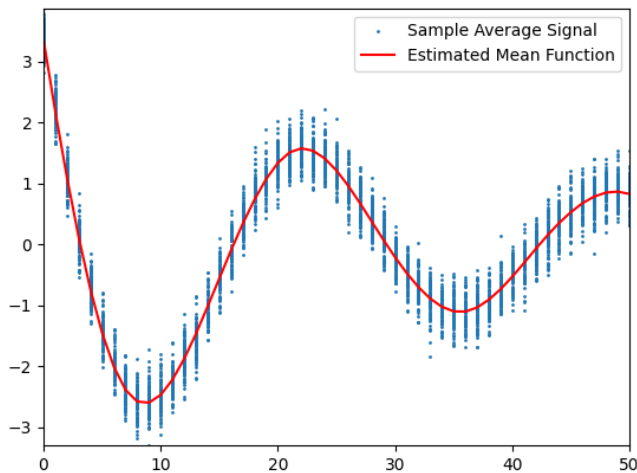


Figure 2: B-Spline Mean Function

Smoothing splines (choose the optimal lambda):

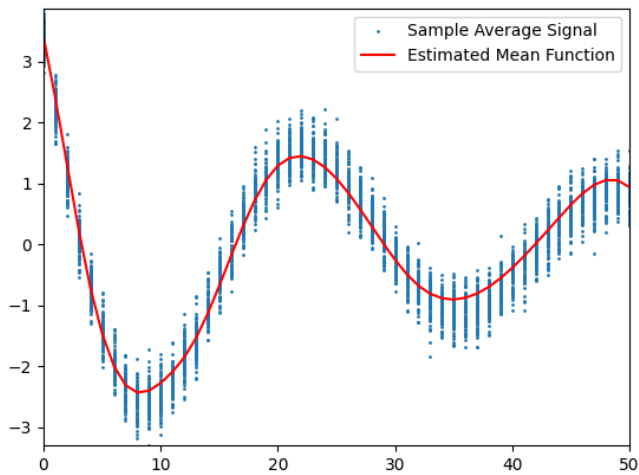


Figure 3: Smoothing Spline Mean Function

Kernel Regression Splines (choose the optimal lambda):

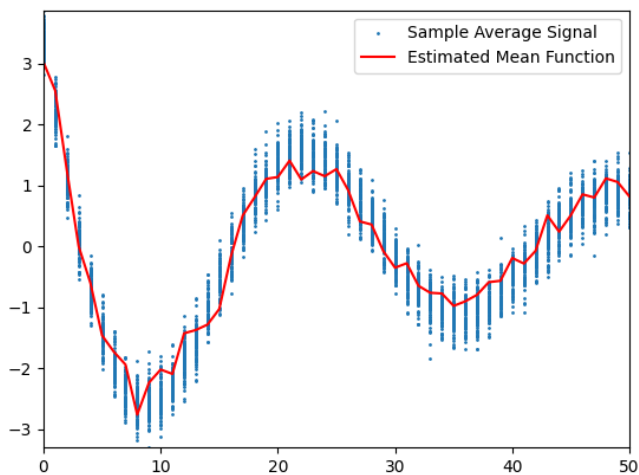


Figure 4: Kernel Regression Mean Function

2 Part B

By computing the mean squared error, select the best model:

Spline Type	MSE
Cubic Spline	0.061758944305198946
Basis Spline	0.061758944305198946
Smoothing Spline	0.07843378843272297
Kernel Regression	0.11361449451802126

Based on the results of the above table, the best model would either be the cubic spline or the basis spline