EML Assignment 4 Problem 1

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Question 1

In a parametric model, the number of parameters does not change as the sample size increases. In a nonparametric model, the number of parameters can increase as the sample size grows.

Question 2

- Ordinary least Square is parametric since the number of the models parameters is specified.

- LASSO is a parametric method as its a regularization over linear regression and linear regression is also parametric. It has a penalty term that is based on the sum of the absolute values of the coefficients of the model.

- Polynomial regression "non-parametric" as the order of the coefficient can grow infinitely for example you have a new feature is x1*x2, x^2, x^3 and so on, so if we don't specify the specific criteria for the independent variable basis expansion the polynomial regression is non parametric method.

- smoothing splines non-parametric. as they do not make any assumptions about the underlying distribution of the data.we just specifiy the number of knots we want in our data and then the functions in different knots has to validate three main rules that their values at the boundary is the same, also their derivatives up to the order of the smaller function - 1 is the same at the boundary.

- Local Regression is a parametric method, as when doing local regression We do not assume anything about the overall form of the function "we don't make global assumptions about the data", but we believe that it can be accurately represented by a member of a small group of parametric functions in specific regions.

- Generalized Additive Models, are non-parametric because they do not make any assumptions about the underlying distribution of the data. The

GAM allows for the inclusion of non-linear relationships between the predictor variables and the response variable.