

NIR data analyzed with splines

The data file `meat.Rdata` contains information on 240 samples of chopped meat that have been analyzed by both a chemical procedure and a near infrared (NIR) absorbance spectroscopy. There are three main variables in the file for each sample of meat:

Fat: Fat content (in percentage) as it was determined by the chemical analysis.

abs.850: Near-infrared absorbance spectra for 850 nm wavelength.

abs.957: Near-infrared absorbance spectra for 975 nm wavelength.

The objective is to predict the fat content from the spectral data, because the chemical analysis is expensive and time consuming but spectroscopy is faster and cheaper.

1. Combine functions `bs` (from library `splines`) and `lm` to estimate the nonparametric regression function of `log(Fat)` as a function of `abs.850` by a cubic spline. Use a 10-fold cross-validation procedure to determine the number of inner knots.
2. Use the function `smooth.spline` to fit the same regression function using the same number of effective parameters (`df`) as before. Compare both fits in the same graphic.