Types of Constrained Functions

**Positive Functions**

It may be intuitively clear from the data we are observing that the functions that produce the data we are observing cannot ever take negative values. For example, peoples heights over time cannot take negative values. Therefore we wish to place constraints on our functions when we are estimating them through smoothing or interpolation that keep them positive.

To do this we let x(t)=exp(w(t))=exp(phi(t)\*c)

**Monotone Functions**

We have data which we know can only move in one direction e.g. number of Bequerels a person has been exposed to in their lifetime (which will always increase) or Amount of money left to be used for a project (which we may know can only decrease for example if no more money is able to be given to the project).

We can set this constraint by making x(t)=integral from t0 to t of w(t) and let model for residuals be that y=beta0+beta1x(t)+error