Braya-sø

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Introduction

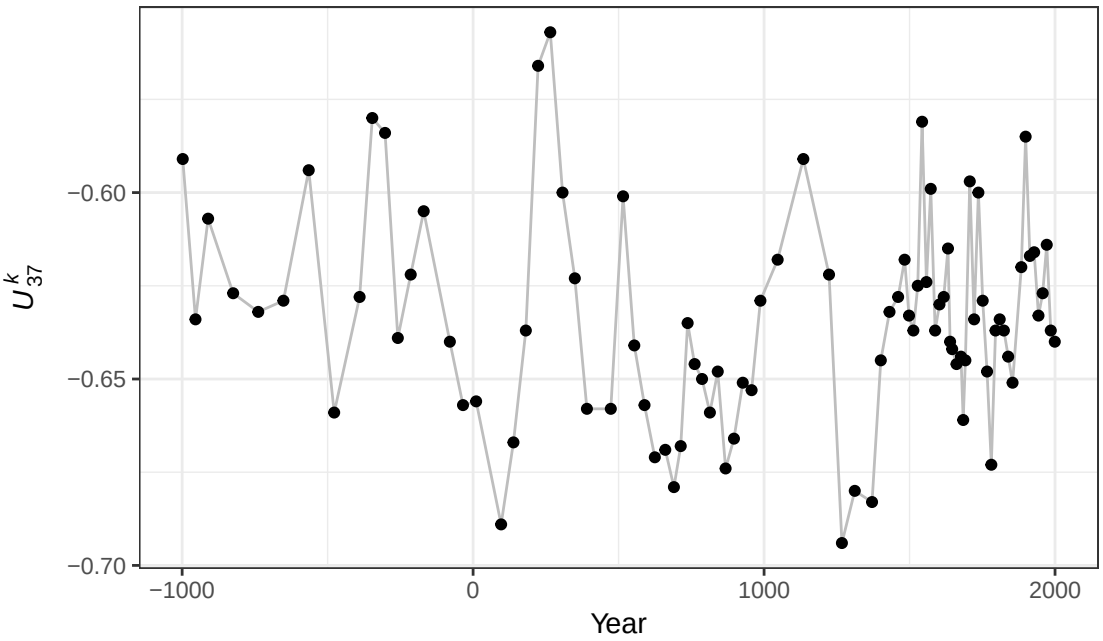
In this example, you'll work with the Braya-sø record that I used in the seminar yesterday. First load some packages

```
library("mgcv")
library("ggplot2")
theme_set(theme_bw())
```

Next load the data

```
braya <- read.tabl("DAndrea.2011.Lake Braya So.txt", skip = 84)
```

We need to do a little data manipulation to fix up the variable names and to add a `sampleInterval` variable. The we prepare a plot of the data using **ggplot2**



The standard GAM we might fit would be a thin-plate spline model. We pass in `sampleInterval` to the `weights` argument. We also need to set the basis quite large in order to capture the true model.

```
Family: gaussian
Link function: identity

Formula:
```

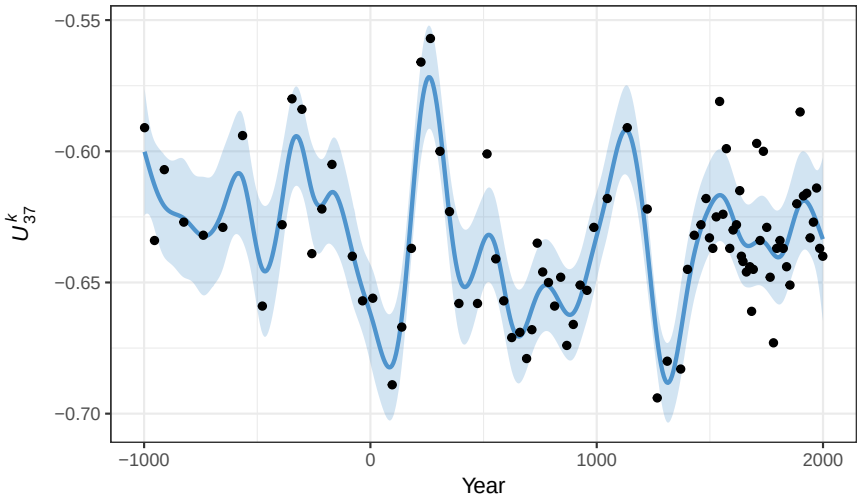
```
UK37 ~ s(Year, k = 40, bs = "tp")

Parametric coefficients:
             Estimate Std. Error t value Pr(>|t|)
(Intercept) -0.633741   0.001929  -328.5   <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Approximate significance of smooth terms:
          edf Ref.df     F p-value
s(Year) 27.45  32.36 7.782  <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

R-sq.(adj) =  0.744   Deviance explained = 82.4%
-REML = -175.61  Scale est. = 0.0076238  n = 89
```

Now we have the fitted model, we can draw the fitted trend using techniques we've seen elsewhere on the course



The thin-plate spline model overfits the record in some parts. We might try an adaptive spline instead of the thin-plate spline. To change he spline type, we us `bs = "ad"` for adaptive spline

```
Family: gaussian
Link function: identity

Formula:
UK37 ~ s(Year, k = 30, bs = "ad")

Parametric coefficients:
             Estimate Std. Error t value Pr(>|t|)
(Intercept) -0.633910   0.002317  -273.6   <2e-16 ***
---
```

```
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Approximate significance of smooth terms:
          edf Ref.df     F  p-value
s(Year) 18.08  20.78 7.158 2.23e-13 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

R-sq.(adj) =  0.629   Deviance explained = 70.6%
-REML = -175.58  Scale est. = 0.011024  n = 89
```

We can now plot this model to look at the fitted trend and compare how it fits relative to the thin-plate one