# Lab session 4

## Exploratory data analysis

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# Question 1

- Plot the SOI and Recruitment data. The variables are given in the `astsa` package. You can try either the standard plot or the `ggplot`.

# Question 2

- Check if there is any long-term trend present in the data (for both series).

# Question 3

- Overlay the fitted lines with both the series.

# Question 4

- Plot the first differences of the two time series.

# Question 5

- Plot the ACF for original SOI series, detrended series, and first differences. Repeat the same for Recruitment series.

# Question 6

- Plot the CCF between SOI and Recruitment. Use the `ccf` function.

# Question 7

- Perform regression of Recruitment $R_t$ based on SOI at lag 6, i.e., $S_{t-6}$. Use the function `ts.intersect` to create the data frame.

# Question 8

- Plot the scatter-plot matrix of the lagged SOI. Use the function `lag1.plot`.

# Question 9

- Plot the scatter-plot matrix of SOI and lagged Recruitment. Use the function `lag2.plot`.

# Question 10

- Go back to Question 7. Perform the regression based on the dummy variable $D_{t-6} = I(S_{t-6} < 0)$ and its interaction with $S_{t-6}$.

Thank you!