# Lab04: Support Vector Machines

**Handed out:** Wednesday, March 29, 2023

**Return date:** Saturday, April 8, 2023, at the eLearning link **Lab04Submit** in the **Lab04** folder.

**Objectives:** Work with different support vector machine algorithms and datasets

**Grades:** This lab counts 16 % towards your final grade

**Format of answer:** Your answers (statistical figures and verbal description) should be submitted electronically as Word document. Add a running title with the following information: Lab04, your name and page numbers. Use this document as template: add your answers for each subtask, i.e., 1 (a) etc., in a red color as well as any requested statistical figures. Trial and error answers will lead to a deduction of points. You are expected to hand in professionally formatted answers: use a fixed pitch font, like **Courier New**, for any  code and output.

## Support Vector Machines [16 points]

**Task 1:** You will answer an applied exercise 5 in James et al., 2021. *An Introduction to Statistical Learning with Application in R*. pages 399 and 400. Please follow the sequence of tasks/questions in the exercises*.* [5 points]

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**Task 2:**. For the following tasks continue working with the **credit.csv** data set to predict the default probabilities. .[5 points]

[a] Split the data into a stratified training data set with 70% of the observations and a test data set with the remaining 30% of the observations.

[b] Use a radial kernel support vector classifier. Identify with cross-evaluation the “optimal” cost parameter.

[c] Evaluate your optimal model with the confusion matrix for the test dataset and the ROC curve including the AUC.