Regression Basics

Curriculum Module

*Created with R2020b. Compatible with R2020b and later releases.*

Description

This package contains a [*live script*](https://www.mathworks.com/products/matlab/live-editor.html) and supporting files to illustrate some basics of regression analysis. The materials are designed to be flexible and can be easily modified to accommodate a variety of teaching and learning methods. We include a brief background, interactive illustrations, tasks, reflection questions, a real-world application example, and a guided exercise for the concepts explored.

**Learning Goals**

* Define linear, nonlinear, and multiple linear regression.
* Assess and improve the performance of a regression model using a goodness-of-fit measure.
* Apply gradient descent to minimize a cost function.
* Explain the effect of increasing and decreasing the learning rate and number of steps for gradient descent.
* Apply a linear regression model to perform short-term forecasting.

Suggested Prework

[MATLAB Onramp](https://www.mathworks.com/learn/tutorials/matlab-onramp.html) – a free two-hour introductory tutorial to learn the essentials of MATLAB.

Details

**regressionBasics.mlx**

An interactive lesson that introduces the fundamentals of regression analysis. Students apply basic linear regression to model real-world electricity load data.

**Products:** MATLAB, Statistics and Machine Learning Toolbox

**electricityLoadData.mlx**

A supplementary script to download the electricity load data for use in the practice problem.

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**regressSolnIm/**

This folder contains supplementary image files containing solutions for **regressionBasics.mlx**. The main script provides controls to hide or expose the solutions when needed.

**Data files (\*.mat)**

Supplementary data files **linearData.mat**, **linearData2.mat**, **multivariateData.mat**, **nonlinearData.mat** to aid the concepts covered in **regressionBasics.mlx.**