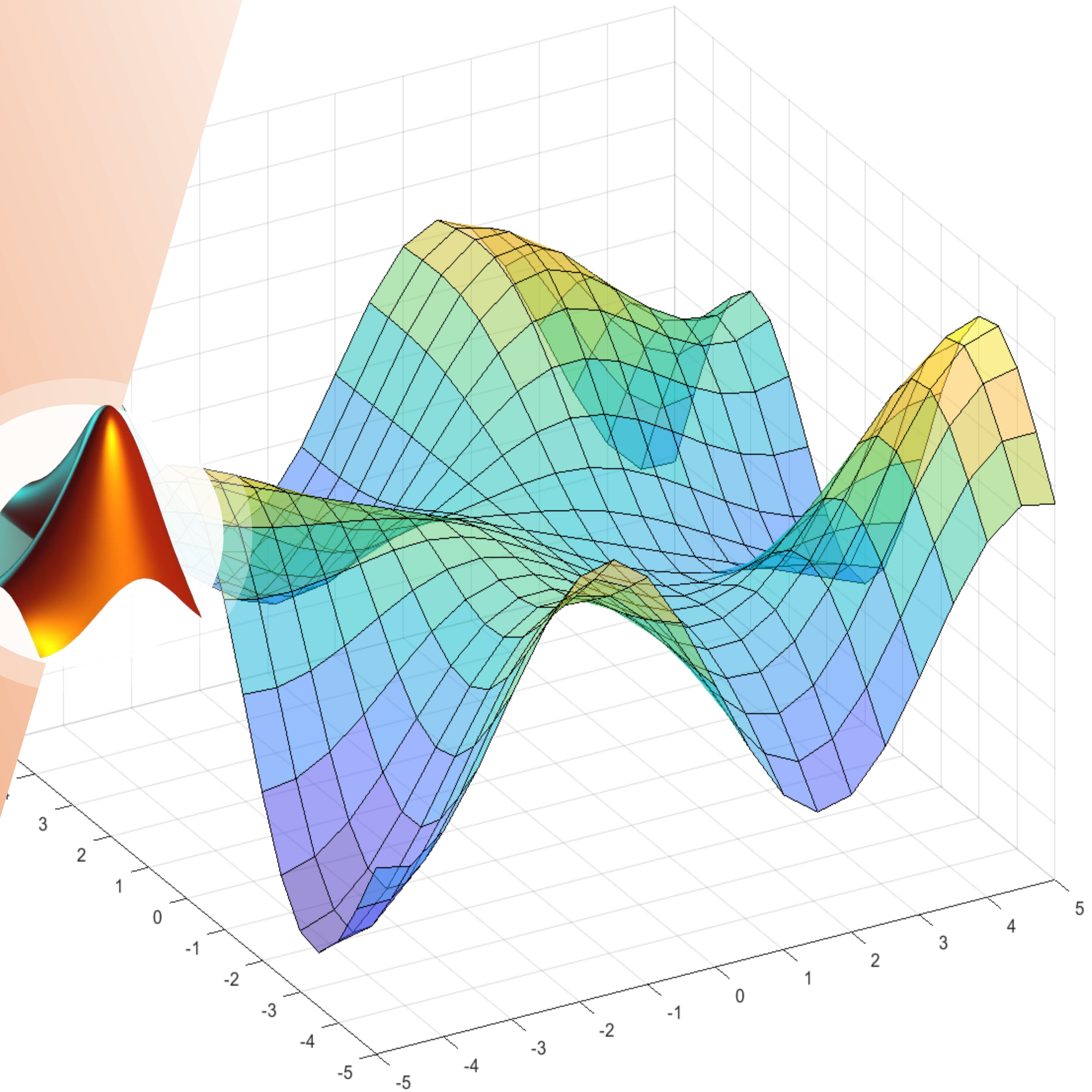
MATLAB

Lineare Regression

Jannik Wiessler, Daimler Truck AG

Q1 2021



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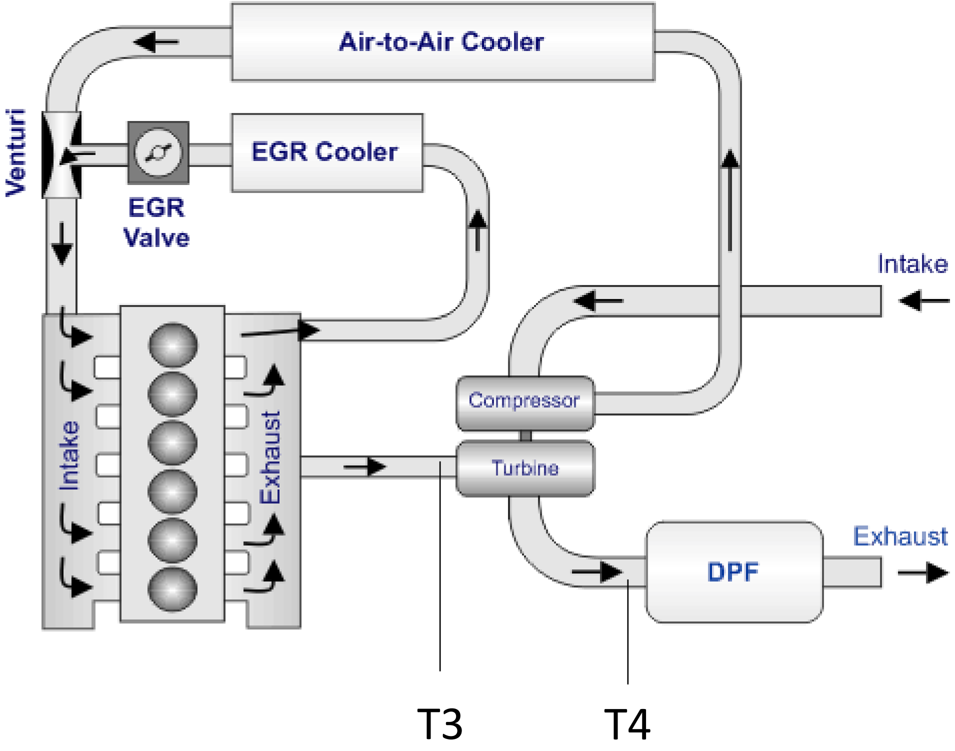
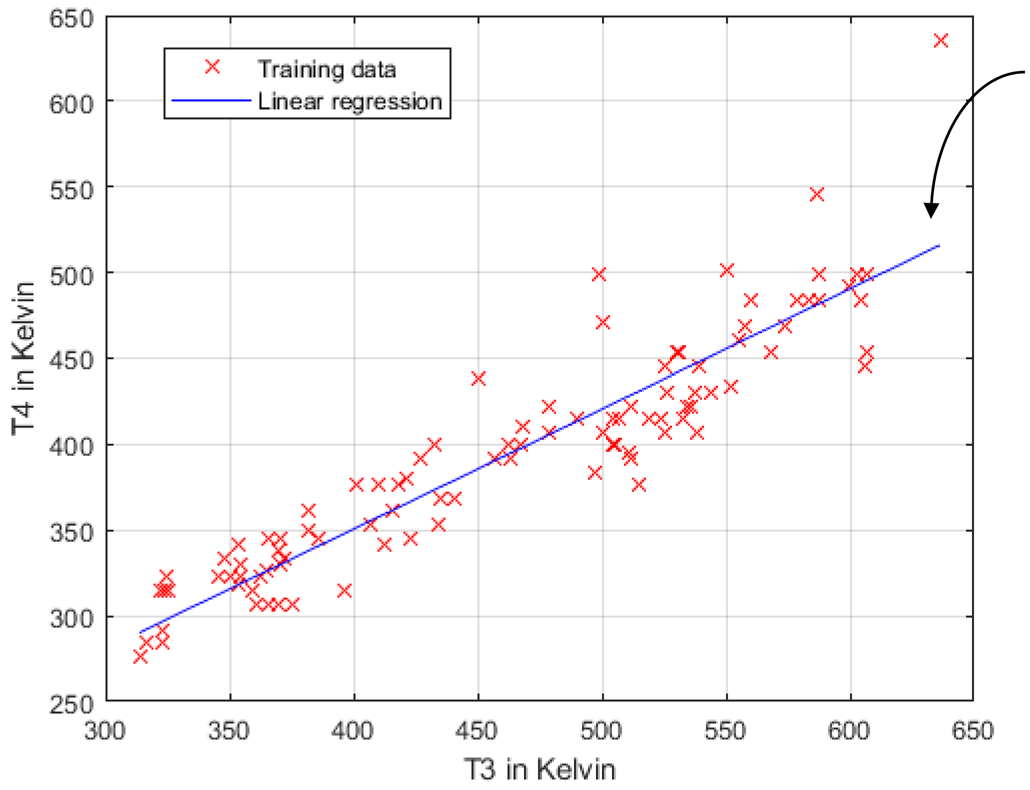
Linear Regression



https://dieselnet.com/tech/engine_egr.php

Linear Regression

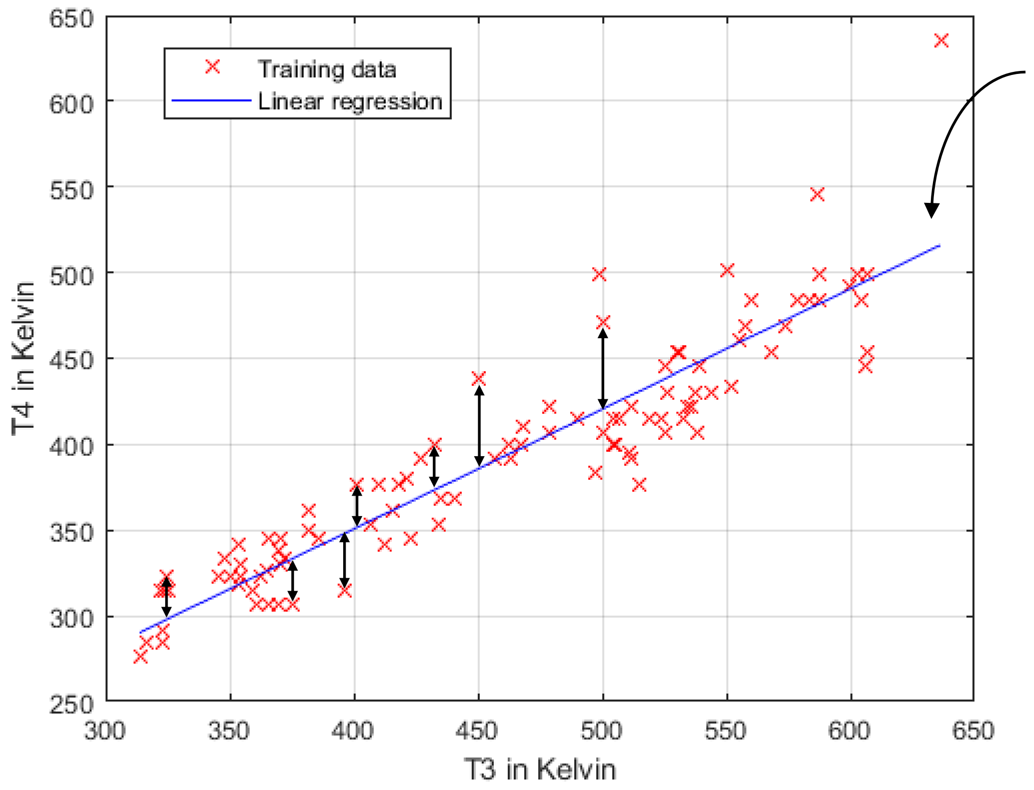


$h_\theta = \theta_0 + \theta_1 x$ Univariante lineare Regression

x: T3	y: T4
365.99	345.41
354.37	322.32
370.49	345.41
370.69	330.02
…	…

m = 98 samples

Linear Regression



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365.99	345.41
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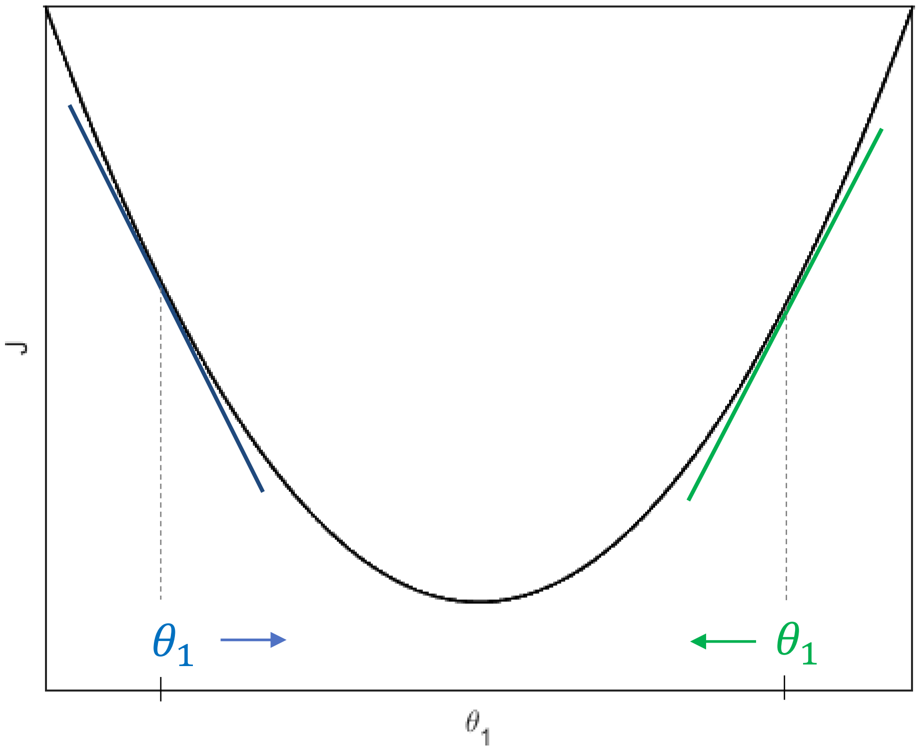
…	…

m = 98 samples

$$\min_{\theta_0,\theta_1} \underbrace{\frac{1}{2m}\sum_{i=1}^{m}(h_\theta(x_i) - y_i)^2}_{J(\theta_0,\theta_1)} = \min_{\theta_0,\theta_1} J$$

cost function
squared error function

Linear Regression

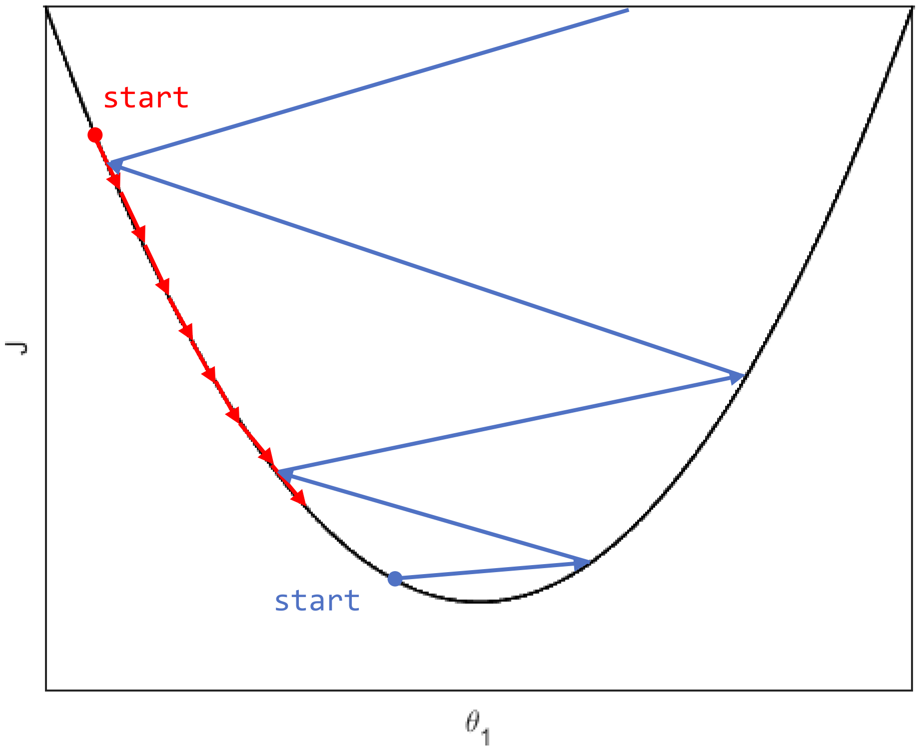


$$\theta_j = \theta_j - \underset{\text{learning rate}}{\alpha} \cdot \underbrace{\frac{\partial}{\partial \theta_j} J(\theta_0, \theta_1)}_{\text{derivative}}$$

$$\theta_1 = \theta_1 - \alpha \cdot \overbrace{\frac{\partial}{\partial \theta_1} J(\theta_0, \theta_1)}^{+} \rightarrow \textit{decrease } \theta_1$$

$$\theta_1 = \theta_1 - \alpha \cdot \overbrace{\frac{\partial}{\partial \theta_1} J(\theta_0, \theta_1)}^{-} \rightarrow \textit{increase } \theta_1$$

Linear Regression



$$\theta_j = \underbrace{\theta_j - \alpha}_{\text{learning rate}} \cdot \underbrace{\frac{\partial}{\partial \theta_j} J(\theta_0, \theta_1)}_{\text{derivative}}$$

α too small: algorithm to slow

α too large: algorithm diverge

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