

in modelling

Ti 5416500 Statistical Analysis of Models, Examination.

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Note to the students: The answers may be written using either English or Finnish Language. Any books (except dictionaries), lecture notes, calculators, etc. are prohibited.

1. Characterize the concepts a) statistical/empirical modelling b) mathematical/mechanistic modelling.
2. Define the concepts a) the R2 value b) the Q2 value
3. Give the Bayes formula. What is the essential benefit of the Bayesian approach?
4. Describe the Metropolis MCMC algorithm.
5. The parameter $\theta = (\theta_1, \theta_2)$ of the model $y = \theta_1(1 - e^{-\theta_2 x})$ is estimated by measured data (x_i, y_i) , $i = 1, \dots, n$. Give a MCMC procedure by which you can determine a) the distribution of θ b) the value of x at which the response y reaches 95 % of its maximum value with 95 % certainty?