

Unit 8 - Week 5

Course outline

How does an NPTEL online course work?

Prerequisite Assignment

MATLAB

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Week 2

Week 3

week 4

Week 5

35 - Introduction to Dynamic Modelling

36 - Introduction to Dynamic Modelling

37 - Introduction to Dynamic Modelling

38 - Lab: Solving ODEs in MATLAB

39 - Lab: Example Biological Model

40 - Parameter Estimation

41 - Parameter Estimation

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43 - Methods for Parameter Estimation

44 - Direct Search Methods

Quiz : Practice Assignment 5

Quiz : Assignment 5

Computational Systems Biology : Week 5 Feedback Form

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Assignment 5

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2020-03-04, 23:59 IST.

1) The reaction rate for the chemical equation $A + 2B \rightleftharpoons C$ is given by:

1 point

$2K_+[A][B] + K_-[C]$

$2K_+[A][B] - K_-[C]$

$K_+[A][B]^2 + K_-[C]$

$K_+[A][B]^2 - K_-[C]$

No, the answer is incorrect.
Score: 0

Accepted Answers:
 $K_+[A][B]^2 - K_-[C]$

Given the following table showing the values for Y for different values of X. Two different sets of parameters, Param 1 and Param 2 are used to predict the values of Y

X	Y _{measured}	Y _{predicted (Param 1)}	Y _{predicted (Param 2)}
10	2	2.5	2
20	7	6	6
30	10	12	11.5
40	17	17	16.5
50	25	25.5	26.1

2) The best parameter set for describing this model is ____.

1 point

Param 1

Param 2

No, the answer is incorrect.
Score: 0

Accepted Answers:
Param 2

3) The least square error (unweighted) is _____. (enter upto 4 decimal places)

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 0.045,0.046

2 points

4) Which of the options best matches the following types of problems with the preferred method of parameter estimation?

1 point

- I.Linear function
II.Quadratic function
III.Multimodal non-linear function

- i.Direct search methods
ii.Regression
iii.Gradient-based search methods

I-(ii), II-(iii), III-(i)

I-(iii), II-(i), III-(ii)

I-(iii), II-(ii), III-(i)

No, the answer is incorrect.
Score: 0

Accepted Answers:
I-(ii), II-(iii), III-(i)

5) A model is _____ if its parameters can be uniquely estimated.

1 point

Stable

Identifiable

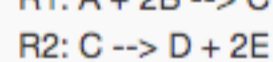
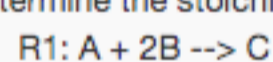
Unique

No, the answer is incorrect.
Score: 0

Accepted Answers:
Identifiable

6) Determine the stoichiometric matrix for the following set of reactions:

0 points



$$\begin{bmatrix} -1 & 0 \\ -2 & 0 \\ -1 & 1 \\ 0 & 1 \\ 0 & 2 \end{bmatrix}$$

$$\begin{bmatrix} -1 & -1 & -1 & 0 & 0 \\ 0 & 0 & 1 & 1 & 2 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 0 \\ 2 & 0 \\ 1 & -1 \\ 0 & -1 \\ 0 & -2 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 1 & 1 & 0 & 0 \\ 0 & 0 & -1 & -1 & -2 \end{bmatrix}$$

No, the answer is incorrect.
Score: 0

Accepted Answers:
 $\begin{bmatrix} -1 & 0 \\ -2 & 0 \\ -1 & 1 \\ 0 & 1 \\ 0 & 2 \end{bmatrix}$

Minimize the function $f(x,y) = (x-3)^4 + (x-3)^2y + (1+y)^2$ using the MATLAB command `fminsearch` starting at $(x_0,y_0) = (1,1)$. The minimum point is at (x^*, y^*)

7) Enter the minimum value of $f(x,y)$ upto 4 decimal places.

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) -0.34,-0.3

2 points

8) Enter x^* upto 4 decimal places:

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 2.1,2.2

0.5 points

9) Enter y^* upto 4 decimal places:

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) -1.34,-1.3

0.5 points