



INSTITUT TEKNOLOGI BANDUNG

DAFTAR HADIR UJIAN

Mata Kuliah : FI4002 Simulasi dan Pemodelan Sistem Fisis
No Kelas : 01
Semester : 2 - 2022/2023
Dosen : Dr. rer. nat. Sparisoma Viridi, S.Si.
Tanggal/Waktu : 9 Maret 2023/11.00 - 13.00

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Part A (in-class)

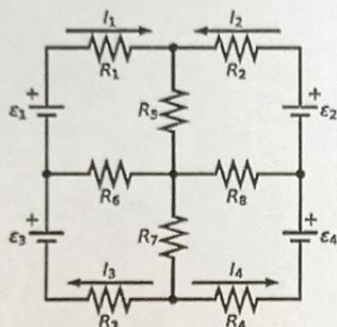
1. simple_stats

$$X = \{4, 7, 5, 1, 3, 6, 4, 8, 5, 7, 2, 5, 6, 3, 9, 6, 8, 5, 7, 4\}$$

1. Write equations to obtain \bar{x} from X and number N of x .
2. Write equations to obtain mean x_{mean} , median x_{med} , and mode x_{mod} of x .
3. Write equation to obtain maximum x_{max} , minimum x_{min} and range x_{range} of x .
4. Write equations to obtain variance x_{var} and standard deviation x_{std} of x .

2. lineq_dc_circuit

1. Write 1st and 2nd Kirchhoff laws
2. Write linear equations for I_1 , I_2 , I_3 , and I_4 for following figure.



3. Write matrix form of previous linear equations.
 4. Write augmented matrix for previous matrix.
 5. Write final matrix that represent values for I_1 , I_2 , I_3 , and I_4 symbolically.
3. linreg_interpolation
1. Write equations of c_0 and c_1 as implementation of linear regression to $y = c_0 + c_1x$.
 2. Write equation of linear interpolation for pairs of data $\{(x_i, y_i) \mid i = 1, 2, \dots, n\}$.
 3. Write equation of Lagrange polynomial interpolation for pairs of data $\{(x_i, y_i) \mid i = 1, 2, \dots, n\}$.
 4. Explain the difference between linear regression and interpolation for the data.
4. flowchart_root_finding
1. Explain all probable meaning of each element below.

Activity 1

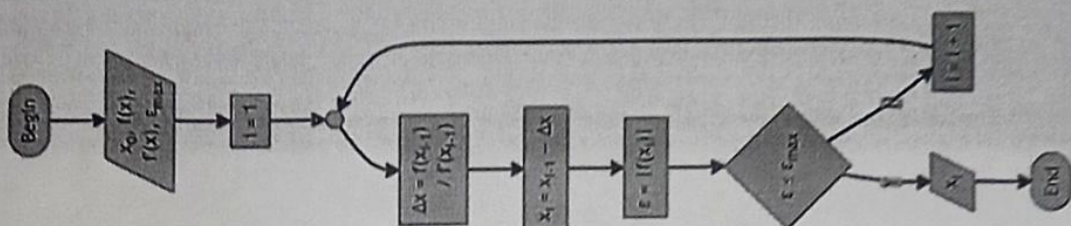
Activity 2

Activity 3

Activity 4



2. Explain in brief the purpose of and also the method used in following flowchart.



3. For $f(x) = x^3 - 2x^2 + x - 1$ and $x \in \{-1, 0, 1, 2\}$ find values for $y = f(x)$.

4. Sketch a graph and guess the root of $f(x)$ from the graph.

5. integ_ode

1. Numerical integration of $\int_a^b f(x) dx$ can be approximated by

$$\left[\alpha f(a) + \beta f\left(\frac{a+b}{2}\right) + \gamma f(b) \right] \frac{(b-a)}{n}. \text{ Write the relation between } \alpha, \beta, \gamma, \text{ and } n.$$

2. Replace the $?$ with the right number in following table.

Method	α	β	γ	n
Rectangle left point	?	?	?	?
Rectangle mid point	?	?	?	?
Rectangle right point	?	?	?	?
Trapezium	?	?	?	?
Simpson	?	?	?	?

3. Tell the difference between initial value problem (IVP) and boundary value problem (BVP).

4. Illustrate the domain and boundary for a BVP using common symbols.

5. Explain about five different boundary conditions (BCs) in solving ODE as a BVP.

Part B (take-home)

url <https://github.com/dudung/fi4002-01-2022-2/issues/4>