

INSTITUT TEKNOLOGI BANDUNG

DAFTAR HADIR UJIAN

: FI4002 Simulasi dan Pemodelan Sistem Fisis Mata Kuliah

No Kelas : 01

Semester : 2 - 2022/2023

: Dr. rer. nat. Sparisoma Viridi, S.Si. Dosen

Tanggal/Waktu : 9 Maret 2023/11.00 - 13.00

	NIM	Nama	Tanda Tangan		
1	10217062	Cornelia Riasdita Valentina	1 prin		
2	10218014	Hafizh Afdhalil Ihsan	2		
3	10218078	Stefany Imanuel Sihombing	3		
4	10219003	Dhia Permata Salsabila	X 4 4		
5	10219026	Muhammad Haidar Aziz	5 7/- 111		
6	10219031	Yoda Taruna Hidayah	6 All		
7	10219044	Tommy Arisandiko	2×210 141		
8	10219047	Rizka Finesya	8		
9	10219049	Mochamad Aria Ibnu Rachmat	9 20 10		
10	10219053	Rais Akbar 'Alim	10 7 10 1		
11	10219061	Luqman Alifio Arhab	11 Min Sarha	7	
12	10219074	Muhammad Farhan	12 5		
13	10219079	Adam Raihan Ramadhani	13 / - 8 CM-		
14	10219080	Miftahul Farid	14 14	14 /201	
15	10219081	Axel Farrel Hutagalung	15/1 2	1	
16	10219082	Rahmalia Nur Azizah	- 16 TAY	L'	
17	10219083	Aria Wahyu Wicaksono	17/1 - < 12/	_	
18	10219094	Valensius Nathanael Huangtama	18 19		
19	10219097	Muhammad Farrel Fasya Alfarizi	19 Oh. 20 J.;		
20	10218043	Muhammad Pizgi	In Jul		



INSTITUT TEKNOLOGI BANDUNG FAKULTAS MATEMATIKA DAN ILMU PENGETAHUAN ALAM

Jalan Ganesha 10 Bandung 40132, Telp: +6222 2515032, Fax +6222 2502360, e-mail: dekan@fmipa.itb.ac.id

Program Studi Fisika

Gedung Fisika Telp: +6222 2500834 Fax: +6222 2506452 fisika@fi.itb.ac.id www.fi.itb.ac.id

BERITA ACARA UJIAN

	. FI 4002 Simulari dan Pemodelan Sistem Fi	2121				
ata kuliah yang diujikan						
ljian diberikan: a) Oleh	. Dr. rer. nat Sparisoma Viridi, S.Si					
b) Untuk	. K-01					
Jumlah pengikut ujian :	10					
Tanggal	g Maret 2023 / 11.00 -13.00					
Waktu	11-00 -13-00 9316					
Ruang	9316					
Jumlah pengawas ujian	: 2					
Hal-hal lain	:					
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	CONTROL OF					
Pengawas Ujian :	Tanda Tangan :					
1. Yulia Pratiwi (10219	072\ Amall					
1. Julia pration diozes	1					
2. Fairuz Izdiharullah (30219[14]					
3	3					
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	See door	• ,				
Mengetahui/Menyetujui : Ketua Departemen Fisika ITE	Bandung, Dosen Penguji,					
Ketua Departemen i isika 172						
()	_) (<u>NIP.:</u>					
NIP.:	NIF					

Ujian Tengah Semester FI 4002 Simulasi dan Pemodelan Sistem Fisis Kamis, 9 Maret 2023, 1100-1300, 9316

Part A (in-class)

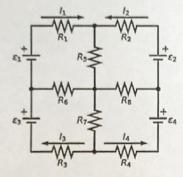
1. simple_stats

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

- 1. Write equations to obtain x from X and number N of x.
- 2. Write equations to obtain mean $x_{
 m mean}$ median $x_{
 m med}$ and mode $x_{
 m mod}$ 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_{var} of x.

2. lineq_dc_circuit

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



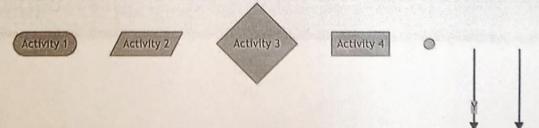
- 3. Write matrix form of previous linear equations.
- 4. Write augmented matrix for previous matrix.
- 5. Write final matrix that represent values for I_1 , I_2 , I_3 , and I_4 , symbolically.

3. linreg_interpolation

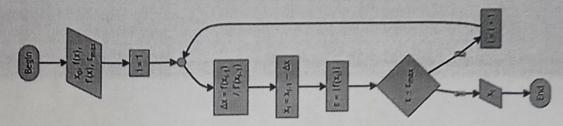
- 1. Write equations of c_0 and c_1 as implementation of linear regression to $y = c_0 + c_1 x$.
- 2. Write equation of linear interpolation for pairs of data $\{(x_i, y_i) \mid i = 1, 2, ..., n\}$.
- 3. Write equation of Lagrange polynomial interpolation for pairs of data $\{(x_i, y_i) \mid i = 1, 2, ..., n\}$.
- 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.



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 $\left[\alpha f(a) + \beta f\left(\frac{a+b}{2}\right) + \gamma f(b)\right] \frac{(b-a)}{n}$. Write the relation between α , β , γ , and n.
 - 2. Replace the with the right number in following table.

Method	α	β	γ	n
Rectangle left point	?	2	5	2
Rectangle mid point	?	7	2	3
Rectangle right point	?	?	2	2
Trapezium	2	2	2	2
Simpson	2	[3]	3	2

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