**TUGAS FINAL – METODE NUMERIK DAN KOMPUTASI**

**Kelompok 1** mengerjakan **soal a**, **Kelompok 2** mengerjakan **soal b**, dst.

1. Buatlah tabel beda hingga dari data-data di bawah ini.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| a. | **x** | **f(x)** |  | b. | **t** | **c(t)** |  | c. | **r** | **F(r)** |
|  | 1.0 | -0.3690 |  |  | 0.5 | 1.7191 |  |  | 3 | 2.1972 |
|  | 1.5 | -0.0704 |  |  | 0.9 | 1.5955 |  |  | 7 | 1.3048 |
|  | 2.0 | 0.3407 |  |  | 1.3 | 0.7830 |  |  | 11 | 0.9536 |
|  | 2.5 | 0.1578 |  |  | 1.7 | -0.3844 |  |  | 15 | 0.7613 |
|  | 3.0 | -0.7106 |  |  | 2.1 | -1.3764 |  |  | 19 | 0.6384 |
|  | 3.5 | -1.5934 |  |  | 2.3 | -1.6600 |  |  | 23 | 0.4023 |
|  | 4.0 | -1.6430 |  |  | 2.5 | -1.7601 |  |  | 27 | 0.3402 |
|  |  |  |  |  |  |  |  |  |  |  |
| d. | **x** | **y(x)** |  | e. | **t** | **d(t)** |  | f. | **r** | **z(r)** |
|  | 0.30 | 1.935 |  |  | 5.000 | 9.3700 |  |  | 0.3000 | 1.2611 |
|  | 0.75 | 1.673 |  |  | 4.667 | 8.1216 |  |  | 0.4167 | 1.3540 |
|  | 1.20 | 1.312 |  |  | 4.333 | 6.3823 |  |  | 0.5333 | 1.5234 |
|  | 1.65 | 0.946 |  |  | 4.000 | 5.7493 |  |  | 0.6500 | 1.6123 |
|  | 2.10 | 0.628 |  |  | 3.667 | 3.7485 |  |  | 0.7667 | 1.8232 |
|  | 2.55 | 0.349 |  |  | 3.333 | 2.7343 |  |  | 0.8833 | 1.9342 |
|  | 3.00 | 0.096 |  |  | 3.000 | 0.8632 |  |  | 1.0000 | 2.1234 |
|  |  |  |  |  |  |  |  |  |  |  |
| g. | **x** | **k(x)** |  |  |  |  |  |  |  |  |
|  | 1.0000 | 0.5324 |  |  |  |  |  |  |  |  |
|  | 4.3333 | 0.3324 |  |  |  |  |  |  |  |  |
|  | 7.6667 | 0.1445 |  |  |  |  |  |  |  |  |
|  | 11.0000 | -0.0123 |  |  |  |  |  |  |  |  |
|  | 14.3333 | -0.1534 |  |  |  |  |  |  |  |  |
|  | 17.6667 | -0.3345 |  |  |  |  |  |  |  |  |
|  | 21.0000 | -0.5333 |  |  |  |  |  |  |  |  |

1. Carilah nilaif(1.1875), c(0.7345), F(5.1121), y(0.5432), d(4.8765), z(0.4023) dan k(3.6667) dengan metode *Newton-Gregory Forward* dari data soal nomor 1.
2. Carilah nilai f(3.8375), c(2.3245), F(24.1121), y(2.8432), d(3,2765), z(0.9023) dan k(19.6667) dengan metode *Newton-Gregory Backward* dari data soal nomor 1.
3. Carilah nilai f(2.3875), c(1.5345), F(13.1121), y(1.4432), d(4,2765), z(0.5723) dan k(8.6667) dengan metode *Stirling* dari data soal nomor 1.
4. Carilah nilai f(1.1875), c(0.7345), F(5.1121), y(0.5432), d(4.8765), z(0.4023) dan k(3.6667) dengan metode *Lagrange* dari data soal nomor 1.
5. Carilah nilai f(1.1875), c(0.7345), F(5.1121), y(0.5432), d(4.8765), z(0.4023) dan k(3.6667) dengan metode *Hermitte* dari data soal nomor 1.
6. Dari data soal nomor 1, gunakanlah metode *Lagrange* untuk mencaril nilai:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| a. | x dari f(x) = 0.2506 | b. | t dari c(t) = 0.5374 | c. | r dari F(r) = 0.3734 |
| d. | x dari y(x) = 0.7486 | e. | t dari d(t) = 7.3794 | f. | r dari z(r) = 1.7346 |
| g. | x dari k(x) = 0.2345 |  |  |  |  |

1. Carilah nilai f’(0.75) dari data dibawah ini dengan metode *Newton Gregory Forward*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| a. | **x** | **f(x)** |  | b. | **t** | **f(t)** |
|  | 0.7 | 0.5214 |  |  | 0.5 | 1.4310 |
|  | 0.8 | 0.5392 |  |  | 1.0 | 2.0350 |
|  | 0.9 | 0.5489 |  |  | 1.5 | 3.0310 |
|  | 1.0 | 0.5518 |  |  | 2.0 | 4.6720 |
|  | 1.1 | 0.5492 |  |  | 2.5 | 7.3790 |
|  | 1.2 | 0.5421 |  |  | 3.0 | 11.8410 |
|  | 1.3 | 0.5314 |  |  | 3.5 | 19.1980 |

1. Carilahnilai f’(2.65) dari data dibawah ini dengan metode *Newton Gregory Backward*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| c. | **x** | **f(x)** |  | d. | **t** | **f(t)** |
|  | 0.5 | 0.4549 |  |  | 0.6 | -0.9195 |
|  | 0.9 | 0.5489 |  |  | 1.0 | 0.0000 |
|  | 1.3 | 0.5314 |  |  | 1.4 | 1.4132 |
|  | 1.7 | 0.4658 |  |  | 1.8 | 3.1740 |
|  | 2.1 | 0.3857 |  |  | 2.2 | 5.2038 |
|  | 2.5 | 0.3078 |  |  | 2.6 | 7.4530 |
|  | 2.9 | 0.2394 |  |  | 3.0 | 9.8875 |

1. Carilah nilai f’(1.15) dan y’(1.586) dari data dibawah ini dengan metode *Stirling*.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| e. | **x** | **f(x)** |  | f. | **t** | **y(t)** |
|  | 0.5 | -1.0397 |  |  | 0.7 | 0.5214 |
|  | 0.8 | -0.5355 |  |  | 0.8 | 0.5392 |
|  | 1.1 | 0.3145 |  |  | 0.9 | 0.5489 |
|  | 1.4 | 1.4132 |  |  | 1.0 | 0.5518 |
|  | 1.7 | 2.7062 |  |  | 1.1 | 0.5492 |
|  | 2.0 | 4.1589 |  |  | 1.2 | 0.5421 |
|  | 2.3 | 5.7471 |  |  | 1.3 | 0.5314 |

1. Carilah nilai f’(1.15) dari data dibawah ini dengan metode *Lagrange*.

|  |  |  |
| --- | --- | --- |
| g. | **x** | **f(x)** |
|  | 0.5 | 0.1650 |
|  | 1.0 | 0.2710 |
|  | 1.5 | 0.4470 |

1. Carilah nilai integral dari data berikut dengan batas dari x=0.1 sampai x=0.7 dengan metode *Trapezoida*.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| a. | **x** | **f(x)** |  | b. | **t** | **c(t)** |  | c. | **r** | **F(r)** |
|  | 0.1 | 0.2002 |  |  | 0.1 | -0.9047 |  |  | 0.1 | 10.0666 |
|  | 0.2 | 0.4014 |  |  | 0.2 | -0.8176 |  |  | 0.2 | 5.1328 |
|  | 0.3 | 0.6049 |  |  | 0.3 | -0.7374 |  |  | 0.3 | 3.5316 |
|  | 0.4 | 0.8122 |  |  | 0.4 | -0.6629 |  |  | 0.4 | 2.7626 |
|  | 0.5 | 1.0257 |  |  | 0.5 | -0.5932 |  |  | 0.5 | 2.3255 |
|  | 0.6 | 1.2488 |  |  | 0.6 | -0.5275 |  |  | 0.6 | 2.0534 |
|  | 0.7 | 1.4865 |  |  | 0.7 | -0.4652 |  |  | 0.7 | 1.8744 |
|  |  |  |  |  |  |  |  |  |  |  |
| d. | **x** | **y(x)** |  | e. | **t** | **d(t)** |  | f. | **r** | **z(r)** |
|  | 0.1 | -10.0066 |  |  | 0.1 | -5.0033 |  |  | 0.1 | -4.9582 |
|  | 0.2 | -4.9924 |  |  | 0.2 | -2.4962 |  |  | 0.2 | -2.4154 |
|  | 0.3 | -3.2882 |  |  | 0.3 | -1.6441 |  |  | 0.3 | -1.5373 |
|  | 0.4 | -2.3892 |  |  | 0.4 | -1.1946 |  |  | 0.4 | -1.0726 |
|  | 0.5 | -1.7874 |  |  | 0.5 | -0.8937 |  |  | 0.5 | -0.7698 |
|  | 0.6 | -1.3030 |  |  | 0.6 | -0.6515 |  |  | 0.6 | -0.5434 |
|  | 0.7 | -0.8428 |  |  | 0.7 | -0.4214 |  |  | 0.7 | -0.3550 |
|  |  |  |  |  |  |  |  |  |  |  |
| g. | **x** | **k(x)** |  |  |  |  |  |  |  |  |
|  | 0.1 | 5.5109 |  |  |  |  |  |  |  |  |
|  | 0.2 | 3.0269 |  |  |  |  |  |  |  |  |
|  | 0.3 | 2.2153 |  |  |  |  |  |  |  |  |
|  | 0.4 | 1.8268 |  |  |  |  |  |  |  |  |
|  | 0.5 | 1.6127 |  |  |  |  |  |  |  |  |
|  | 0.6 | 1.4913 |  |  |  |  |  |  |  |  |
|  | 0.7 | 1.4299 |  |  |  |  |  |  |  |  |

1. Carilah nilai integral dari data berikut dengan batas dari x=0.1 sampai x=0.7 dengan metode *Simpson 1/3.*

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| a. | **x** | **f(x)** |  | b. | **t** | **c(t)** |  | c. | **r** | **F(r)** |
|  | 0.1 | 10.1165 |  |  | 0.1 | 2.1910 |  |  | 0.1 | 2.0937 |
|  | 0.2 | 5.2322 |  |  | 0.2 | 2.1642 |  |  | 0.2 | 1.1893 |
|  | 0.3 | 3.6794 |  |  | 0.3 | 2.1200 |  |  | 0.3 | 0.9559 |
|  | 0.4 | 2.9574 |  |  | 0.4 | 2.0593 |  |  | 0.4 | 0.8958 |
|  | 0.5 | 2.5653 |  |  | 0.5 | 1.9831 |  |  | 0.5 | 0.9124 |
|  | 0.6 | 2.3357 |  |  | 0.6 | 1.8930 |  |  | 0.6 | 0.9765 |
|  | 0.7 | 2.1965 |  |  | 0.7 | 1.7912 |  |  | 0.7 | 1.0797 |
|  |  |  |  |  |  |  |  |  |  |  |
| d. | **x** | **y(x)** |  | e. | **t** | **d(t)** |  | f. | **r** | **z(r)** |
|  | 0.1 | 1.1049 |  |  | 0.1 | 2.9883 |  |  | 0.1 | 5.1338 |
|  | 0.2 | 1.2190 |  |  | 0.2 | 1.9667 |  |  | 0.2 | 2.7706 |
|  | 0.3 | 1.3423 |  |  | 0.3 | 1.6019 |  |  | 0.3 | 2.0804 |
|  | 0.4 | 1.4751 |  |  | 0.4 | 1.3941 |  |  | 0.4 | 1.8168 |
|  | 0.5 | 1.6189 |  |  | 0.5 | 1.2437 |  |  | 0.5 | 1.7347 |
|  | 0.6 | 1.7763 |  |  | 0.6 | 1.1177 |  |  | 0.6 | 1.7571 |
|  | 0.7 | 1.9517 |  |  | 0.7 | 1.0023 |  |  | 0.7 | 1.8571 |
|  |  |  |  |  |  |  |  |  |  |  |
| g. | **x** | **k(x)** |  |  |  |  |  |  |  |  |
|  | 0.1 | 1.2015 |  |  |  |  |  |  |  |  |
|  | 0.2 | 1.4178 |  |  |  |  |  |  |  |  |
|  | 0.3 | 1.6729 |  |  |  |  |  |  |  |  |
|  | 0.4 | 2.0097 |  |  |  |  |  |  |  |  |
|  | 0.5 | 2.5263 |  |  |  |  |  |  |  |  |
|  | 0.6 | 3.5275 |  |  |  |  |  |  |  |  |
|  | 0.7 | 6.7373 |  |  |  |  |  |  |  |  |

1. Carilah nilai y(0.1) dari persamaan diferensial dibawah ini dengan metode *Taylor*.

a. c.



b. d.



1. Carilah nilai y(0.01) dari persamaan diferensial berikut dengan metode *Euler*.

e. g.



f.



=====================================================================

**Kelompok 1.** Gambarkan *flowchart* dari metode penyelesaian akar-akar persamaan karakteristik:

1. Metode Tabulasi;
2. Metode Biseksi;
3. Metode Regula Falsi.

**Kelompok 2.** Gambarkan *flowchart* dari metode penyelesaian akar-akar persamaan karakteristik:

1. Metode iterasi bentuk x=g(x);
2. Metode *Newton-Raphson*;
3. Metode Invers dan Determinan Matriks.

**Kelompok 3.** Gambarkan *flowchart* dari metode penyelesaian persamaan linear serentak:

1. Metode Dekomposisi L-U;
2. Metode *Iterasi Jakobi*;
3. Metode *Gauss Siedel*.

**Kelompok 4.** Gambarkan *flowchart* dari metode penyelesaian interpolasi:

1. Metode *Newton-Gregory Forward*;
2. Metode *Newton-Gregory Backward*;
3. Metode *Stirling*.

**Kelompok 5.** Gambarkan *flowchart* dari metode penyelesaian interpolasi:

1. Metode *Lagrange*;
2. Metode *Hermitte*.

**Kelompok 6.** Gambarkan *flowchart* dari metode integrasi numerik:

1. Metode *Trapezoida*;
2. Metode *Simpson* 1/3.

**Kelompok 7.** Gambarkan *flowchart* dari metode penyelesaian persamaan diferensial:

1. Metode *Taylor*;
2. Metode *Euler*.

=====================================================================

**Kelompok 1 – Kelompok 4**

Tuliskan script program mfile dari salah satu metode penyelesaian akar-akar persamaan karakteristik kemudian berikan 1 contoh penyelesaian permasalahan. **(Tiap kelompok menggunakan metode yang berbeda)**

**Kelompok 5 – Kelompok 7**

Tuliskan script program mfile dari salah satu metode penyelesaian persamaan linear serentak kemudian berikan 1 contoh penyelesaian permasalahan. **(Tiap kelompok menggunakan metode yang berbeda)**

=====================================================================