Zadania na ocene 5

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Wstęp

W celu uproszczenia, wszystkie algorytmy są zaprojektowane jako podprogramy, głównej aplikacji.  W załączniku znajduje się jeden program wykonywalny zawierający 5 podprogramów.

Menu programu:

Do wyboru mamy 5 podprogramów (algorytmów):

*1) Kalkulator równania sześcienne (trzeciego stopnia)*

*2) Kalkulator równania czwartego stopnia*

*3) Kalkulator równego podziału (algorytm bisekcji)*

*4) Problem plecakowy:*

*5) Problem komiwojażera:*

Aby uruchomić konkretny podprogram należy wprowadzić liczbę od 1 do 5 a następnie kliknąć enter.

Obraz zawierający tekst

Opis wygenerowany automatycznie

Kalkulator równania sześcienne (trzeciego stopnia) – zadanie na 3.0

Przypadek 1 : Delta > 0

Wprowadzamy wartości 2,4,6,8

Wynik:

x1=-1,6506291914393882, x2=-0,17468540428030588 + 1,5468688872313963i, x3=-0,17468540428030588 - 1,5468688872313963i

Obraz zawierający tekst

Opis wygenerowany automatyczniePrzykład:

Przypadek 2 : Delta < 0

Wprowadzamy wartości *3,11,15,9*

Wynik:

x1=-1,8304995050986423, x2=-0,9180835807840123 + 0,8921992256027562i, x3=-0,9180835807840123 - 0,8921992256027562i

Przykład:

Obraz zawierający tekst

Opis wygenerowany automatycznie

Przypadek 3 : Delta == 0

Wprowadzamy wartości *1, 0, 0, 0*

Wynik:

*x1=0, x2=0, x3=0*

Przykład:

Obraz zawierający tekst

Opis wygenerowany automatycznie

Kalkulator równania czwartego stopnia – zadanie na 3.5

Przypadek 1 : Delta > 0

Wprowadzamy wartości: *18,19,20,16,1*

Wynik:

1y^3 + 0,34664351851851855y^2 + 0,059086831454332425y + -0,003156772625806991 = 0

Delta = 1,2153374801841082E-05

urojona: 0,19396524387523284

**Jeden pierwiastek rzeczywisty i dwa zespolone.**

x1 = 0,04188825978865825

-0,1942658891535884 + 0,19396524387523284i

-0,1942658891535884 - 0,19396524387523284i

Przykład:

Obraz zawierający tekst

Opis wygenerowany automatycznie

Przypadek 2 : Delta < 0

Wprowadzamy wartości: *2,3,4,5,6*

Wynik:

1y^3 + 0,578125y^2 + -0,487548828125y + -0,031589508056640625 = 0

Delta = -0,006488517478660302

**Trzy pierwiastki rzeczywiste:**

0,5068234138058635, -1,024085911901492, -0,06086250190437187

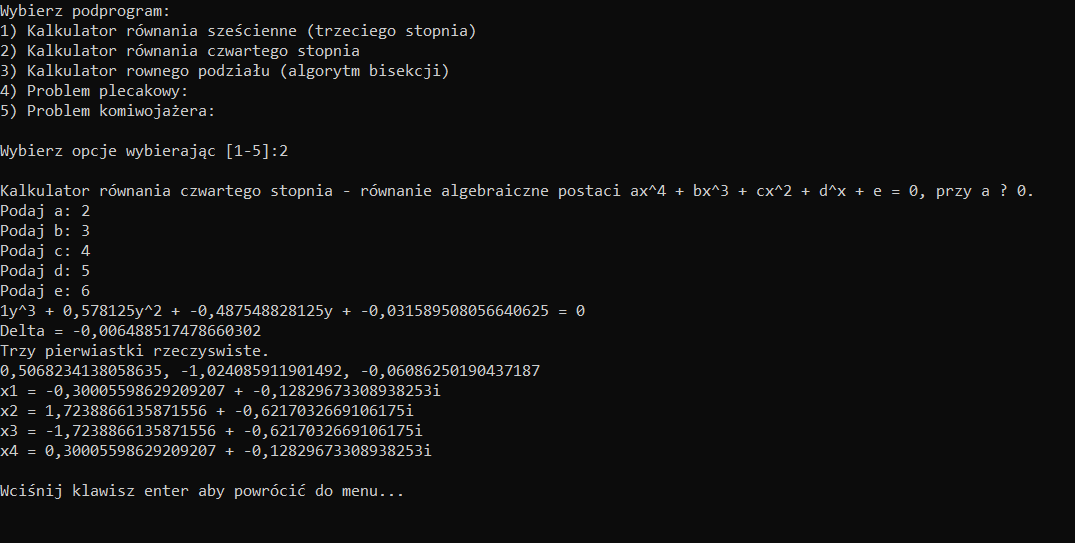
x1 = -0,30005598629209207 + -0,12829673308938253i

x2 = 1,7238866135871556 + -0,6217032669106175i

x3 = -1,7238866135871556 + -0,6217032669106175i

x4 = 0,30005598629209207 + -0,12829673308938253i

Przykład:



Przypadek 3 : Delta == 0

Wprowadzamy wartości: *1, 0, 0, 0, 0*

Wynik:

*1y^3 + 0y^2 + 0y + -0 = 0*

*Delta = 0*

*-0, 0*

*Wynikiem równania są dwa pierwiastki rzeczywiste: -0 oraz drugi-podwójny: 0*

Przykład:

Obraz zawierający tekst

Opis wygenerowany automatycznie

Kalkulator równego podziału (algorytm bisekcji) – zadanie na 4.0

Przypadek 1 :

1,2,3,4,5,6

*Enter begining of interval: -100*

*Enter end of interval: 100*

*Enter precision of method: 0,001*

Wynik:

*Interval begin: -100*

*Interval end: 100*

*Root: 0*

*Root: -50*

*Root: -25*

*Root: -12,5*

*Root: -6,25*

*Root: -3,125*

*Root: -1,5625*

*Root: -0,78125*

*Root: -1,171875*

*Root: -1,3671875*

*Root: -1,46484375*

*Root: -1,513671875*

*Root: -1,4892578125*

*Root: -1,50146484375*

*Root: -1,495361328125*

*Root: -1,4923095703125*

*Root: -1,49078369140625*

*Root: -1,491546630859375*

Przykład:

Obraz zawierający tekst

Opis wygenerowany automatycznieProblem plecakowy – zadanie na 4.5

Obraz zawierający tekst

Opis wygenerowany automatycznie

 Problem komiwojażera – zadanie na 5.0

Przypadek 1 :

Liczba miast : 10

Wynik:

1, 2, 3, 4, 5, 6, 7, 8, 9, 10,

9, 1, 3, 8, 5, 4, 7, 6, 10, 2,

14,2,10,11,14,9,25,24,6,15,

3,3,16,9,20,24,26,16,24,8,

23,27,23,13,23,29,3,15,4,13,

24,12,2,2,1,6,21,22,27,6,

15,27,24,24,20,8,14,8,1,23,

26,5,23,24,4,17,9,26,17,14,

6,10,20,22,21,21,1,14,8,14,

3,4,18,18,22,26,3,28,23,15,

16,25,15,11,17,19,18,8,28,14,

27,25,6,13,29,5,8,3,4,29,

Current gene: 9, 1, 3, 8, 5, 4, 7, 6, 10, 2,

Current minimum cost: 152

Current gene: 9, 1, 10, 8, 5, 4, 7, 6, 3, 2,

Current minimum cost: 172

Current gene: 9, 1, 10, 8, 5, 3, 7, 6, 4, 2,

Current minimum cost: 140

Current gene: 9, 1, 10, 8, 5, 3, 7, 6, 4, 2,

Current minimum cost: 140

Current gene: 9, 5, 10, 8, 1, 3, 7, 6, 4, 2,

Current minimum cost: 116

Current gene: 10, 5, 9, 8, 1, 3, 7, 6, 4, 2,

Current minimum cost: 111

Current gene: 10, 5, 1, 8, 9, 3, 7, 6, 4, 2,

Current minimum cost: 166

Current gene: 5, 10, 1, 8, 9, 3, 7, 6, 4, 2,

Current minimum cost: 172

Current gene: 5, 10, 1, 4, 9, 3, 7, 6, 8, 2,

Current minimum cost: 157

The best gene is: 5, 10, 6, 4, 9, 3, 7, 1, 8, 2,

Przykład:

Obraz zawierający tekst

Opis wygenerowany automatycznie

Przypadek 2 :

Liczba miast : 27

Wynik:

 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27,

26, 8, 7, 25, 13, 12, 16, 4, 20, 14, 5, 2, 18, 3, 10, 21, 22, 27, 9, 11, 23, 6, 24, 17, 15, 19, 1,

13,20,29,17,12,12,13,8,23,20,19,11,5,21,26,7,25,22,13,8,22,22,21,25,10,26,11,

27,14,20,22,3,10,3,19,11,19,27,8,22,21,2,4,14,4,3,24,15,20,10,24,29,19,23,

25,20,29,4,8,16,2,16,24,4,28,16,2,2,2,15,17,28,15,21,17,20,19,7,22,8,2,

25,7,4,26,22,14,16,7,29,12,16,20,21,20,5,8,1,16,17,1,22,13,6,22,26,15,28,

6,5,1,22,12,1,15,6,10,20,7,6,3,15,25,3,4,2,9,23,1,13,13,19,20,5,7,

9,12,2,12,1,8,15,11,2,28,19,4,19,7,14,24,17,23,11,15,16,27,11,2,20,18,21,

28,23,22,12,3,7,23,7,24,8,9,7,27,18,5,23,4,15,27,19,17,16,18,25,25,10,20,

20,11,2,29,21,13,17,16,17,10,17,17,26,25,1,20,16,9,17,14,26,12,4,7,17,22,28,

4,12,6,26,17,23,17,4,25,23,9,17,23,11,2,18,14,17,27,1,23,17,26,2,16,8,26,

23,9,7,24,12,28,14,13,4,11,13,29,23,10,22,5,27,8,21,24,3,25,23,20,20,19,21,

6,17,16,5,10,10,27,24,24,18,28,26,19,10,27,27,7,1,18,5,21,1,12,28,23,25,14,

23,28,15,17,5,23,7,8,26,18,7,3,20,26,15,28,17,28,11,3,15,5,27,17,19,2,15,

1,6,6,17,11,15,25,4,26,9,2,24,4,13,2,2,10,1,28,27,8,6,2,24,29,12,22,

29,18,1,28,27,3,8,7,3,20,1,25,17,24,23,19,19,15,5,8,20,13,3,18,17,21,5,

8,24,4,11,17,29,23,26,16,25,11,5,21,26,6,28,11,9,5,11,4,15,17,13,9,25,5,

3,16,15,13,11,6,28,29,13,28,10,13,26,24,27,8,24,9,11,13,12,14,14,21,9,13,11,

2,23,8,21,2,22,25,20,11,1,13,29,28,23,26,23,1,2,26,9,16,6,7,22,4,28,12,

22,18,2,24,4,28,25,26,7,6,8,9,21,2,4,17,8,12,9,13,20,15,21,14,20,13,4,

25,25,16,15,17,4,11,3,3,9,6,9,2,4,26,20,18,22,22,5,8,12,18,29,11,25,15,

22,8,27,17,4,21,24,29,2,20,21,21,6,10,29,2,8,2,4,7,9,23,25,3,22,27,8,

26,13,8,16,4,21,18,18,24,5,21,3,17,7,4,25,29,27,1,17,25,9,11,10,28,8,18,

7,29,12,24,25,6,13,28,17,24,4,17,29,18,22,5,26,17,28,16,1,6,27,25,6,21,11,

13,18,3,27,18,25,4,12,19,13,10,26,26,4,9,16,2,26,10,2,28,3,4,14,23,29,22,

18,1,2,17,19,4,24,1,10,15,26,16,22,26,7,3,22,16,20,2,12,21,19,26,29,25,20,

12,10,14,18,4,18,4,16,11,18,26,20,22,3,4,28,2,6,10,18,5,22,1,12,27,4,28,

11,26,12,6,17,24,14,12,20,26,26,22,28,19,11,25,15,26,26,27,29,8,23,17,21,20,7,

15,19,10,2,21,1,20,22,19,28,13,9,26,8,20,14,3,6,13,12,29,24,26,16,16,2,6,

Current gene: 26, 8, 7, 25, 13, 12, 16, 4, 20, 14, 5, 2, 18, 3, 10, 21, 22, 27, 9, 11, 23, 6, 24, 17, 15, 19, 1,

Current minimum cost: 350

Current gene: 26, 8, 15, 25, 13, 12, 16, 4, 20, 14, 5, 2, 18, 3, 10, 21, 22, 27, 9, 11, 23, 6, 24, 17, 7, 19, 1,

Current minimum cost: 351

Current gene: 26, 8, 6, 25, 13, 12, 16, 4, 20, 14, 5, 2, 18, 3, 10, 21, 22, 27, 9, 11, 23, 15, 24, 17, 7, 19, 1,

Current minimum cost: 369

Current gene: 26, 8, 6, 25, 13, 12, 16, 4, 20, 14, 5, 2, 17, 3, 10, 21, 22, 27, 9, 11, 23, 15, 24, 18, 7, 19, 1,

Current minimum cost: 379

Current gene: 26, 8, 6, 25, 13, 12, 16, 4, 20, 14, 5, 2, 17, 3, 10, 19, 22, 27, 9, 11, 23, 15, 24, 18, 7, 21, 1,

Current minimum cost: 391

Current gene: 26, 8, 6, 25, 13, 12, 16, 4, 20, 11, 5, 2, 17, 3, 10, 19, 22, 27, 9, 14, 23, 15, 24, 18, 7, 21, 1,

Current minimum cost: 378

Current gene: 26, 8, 6, 25, 23, 12, 16, 4, 20, 11, 5, 2, 17, 3, 10, 19, 22, 27, 9, 14, 13, 15, 24, 18, 7, 21, 1,

Current minimum cost: 366

Current gene: 26, 8, 6, 25, 23, 12, 16, 9, 20, 11, 5, 2, 17, 3, 10, 19, 22, 27, 4, 14, 13, 15, 24, 18, 7, 21, 1,

Current minimum cost: 358

Current gene: 26, 8, 6, 25, 23, 12, 16, 9, 20, 11, 5, 2, 17, 3, 10, 19, 22, 27, 24, 14, 13, 15, 4, 18, 7, 21, 1,

Current minimum cost: 376

Current gene: 26, 18, 6, 25, 23, 12, 16, 9, 20, 11, 5, 2, 17, 3, 10, 19, 22, 27, 24, 14, 13, 15, 4, 8, 7, 21, 1,

Current minimum cost: 388

Current gene: 26, 18, 6, 25, 23, 12, 16, 9, 20, 11, 5, 2, 17, 3, 21, 19, 22, 27, 24, 14, 13, 15, 4, 8, 7, 10, 1,

Current minimum cost: 369

Current gene: 26, 18, 6, 25, 23, 12, 16, 9, 27, 11, 5, 2, 17, 3, 21, 19, 22, 20, 24, 14, 13, 15, 4, 8, 7, 10, 1,

Current minimum cost: 378

Current gene: 26, 18, 6, 25, 23, 12, 16, 9, 27, 11, 5, 2, 17, 3, 21, 19, 22, 13, 24, 14, 20, 15, 4, 8, 7, 10, 1,

Current minimum cost: 430

Current gene: 26, 18, 6, 25, 23, 12, 11, 9, 27, 16, 5, 2, 17, 3, 21, 19, 22, 13, 24, 14, 20, 15, 4, 8, 7, 10, 1,

Current minimum cost: 422

Current gene: 26, 18, 6, 25, 23, 12, 9, 11, 27, 16, 5, 2, 17, 3, 21, 19, 22, 13, 24, 14, 20, 15, 4, 8, 7, 10, 1,

Current minimum cost: 414

Current gene: 26, 18, 6, 25, 23, 12, 9, 11, 27, 16, 5, 2, 17, 3, 21, 19, 22, 14, 24, 13, 20, 15, 4, 8, 7, 10, 1,

Current minimum cost: 412

Current gene: 26, 18, 6, 25, 23, 12, 9, 11, 27, 16, 5, 2, 17, 20, 21, 19, 22, 14, 24, 13, 3, 15, 4, 8, 7, 10, 1,

Current minimum cost: 357

Current gene: 26, 18, 6, 25, 23, 12, 9, 11, 27, 16, 5, 2, 17, 20, 21, 19, 22, 4, 24, 13, 3, 15, 14, 8, 7, 10, 1,

Current minimum cost: 382

Current gene: 26, 18, 6, 25, 23, 12, 9, 11, 27, 16, 5, 2, 17, 20, 21, 19, 22, 24, 4, 13, 3, 15, 14, 8, 7, 10, 1,

Current minimum cost: 377

Current gene: 26, 18, 20, 25, 23, 12, 9, 11, 27, 16, 5, 2, 17, 6, 21, 19, 22, 24, 4, 13, 3, 15, 14, 8, 7, 10, 1,

Current minimum cost: 384

Current gene: 26, 18, 20, 25, 23, 12, 9, 11, 27, 16, 7, 2, 17, 6, 21, 19, 22, 24, 4, 13, 3, 15, 14, 8, 5, 10, 1,

Current minimum cost: 435

Current gene: 26, 18, 20, 25, 23, 12, 9, 11, 27, 16, 7, 2, 17, 6, 21, 19, 22, 24, 4, 13, 3, 15, 14, 8, 5, 10, 1,

Current minimum cost: 435

Current gene: 26, 18, 8, 25, 23, 12, 9, 11, 27, 16, 7, 2, 17, 6, 21, 19, 22, 24, 4, 13, 3, 15, 14, 20, 5, 10, 1,

Current minimum cost: 427

Current gene: 11, 18, 8, 25, 23, 12, 9, 26, 27, 16, 7, 2, 17, 6, 21, 19, 22, 24, 4, 13, 3, 15, 14, 20, 5, 10, 1,

Current minimum cost: 394

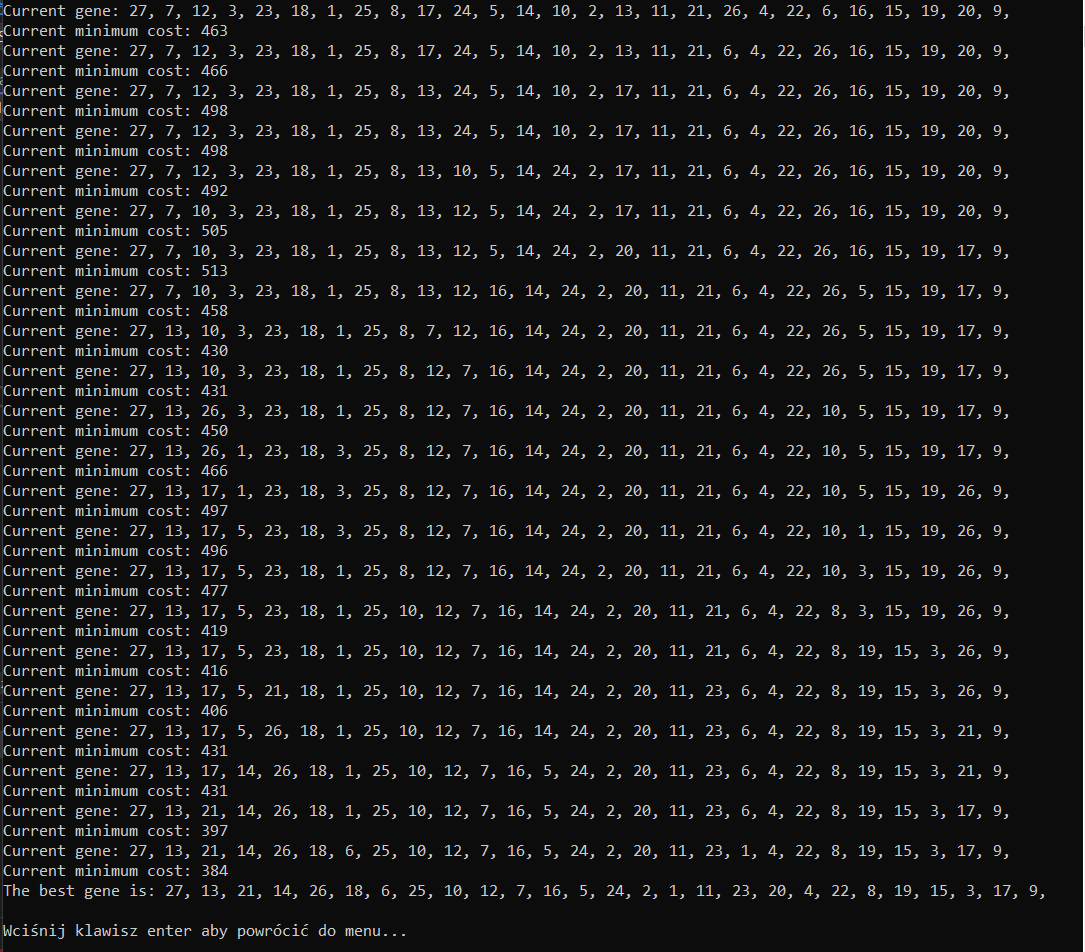
Current gene: 11, 18, 4, 25, 23, 12, 9, 26, 27, 16, 7, 2, 17, 6, 21, 19, 22, 24, 8, 13, 3, 15, 14, 20, 5, 10, 1,

Current minimum cost: 390

Current gene: 11, 18, 4, 25, 23, 12, 9, 26, 27, 16, 7, 2, 17, 6, 21, 19, 22, 24, 8, 13, 3, 15, 14, 20, 5, 10, 1,

Current minimum cost: 390

The best gene is: 11, 18, 4, 25, 23, 12, 9, 26, 27, 16, 7, 10, 17, 6, 21, 19, 22, 24, 8, 13, 3, 15, 14, 20, 5, 2, 1,

Obraz zawierający tekst

Opis wygenerowany automatycznie