Numerical analysis laboratory work №4

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Abstract

Finding eigenvalues of a matrix

System

$$A = \begin{bmatrix} 6.3 & 1.07 & 0.99 & 1.2 \\ 1.07 & 4.12 & 1.3 & 0.16 \\ 0.99 & 1.3 & 5.48 & 2.1 \\ 1.2 & 0.16 & 2.1 & 6.06 \end{bmatrix}$$

Program output

```
$ go build && ./lab4
A =   6.3  1.07  0.99   1.2
     1.07  4.12   1.3  0.16
     0.99   1.3  5.48   2.1
      1.2  0.16   2.1  6.06

Eigenvalues of A:
[(9.231213674637974+0i) (2.805857676530958+0i) (5.450954011402351+0i) (4.471974637428714+0i)
initial vector y0: _______________
|             |
|   0.000000  |
|   0.000000  |
|   0.000000  |
|   1.000000  |
|_____________|
Full Krylov system
_____________________________________________________________________
|                                                                   |
|   190.148396    17.082200     1.200000     0.000000 |  -1936.979267  |
|    81.661162     5.642800     0.160000     0.000000 |   -923.647933  |
|   254.157738    25.630000     2.100000     0.000000 |  -2387.279671  |
|   333.375640    42.599200     6.060000     1.000000 |  -2795.231489  |
|___________________________________________________________________|
Coefficients
```

```
-----------------
|               |
|     1.000000  |
|   -21.960000  |
|   169.721000  |
|  -550.440464  |
|   631.387954  |
|_______________|
Eigenvalues:

---------------
|             |
|   2.805858  |
|   4.471975  |
|   5.450954  |
|   9.231214  |
|_____________|
```

The solution coincides with the one we got using `gonum` library

$$\begin{pmatrix} 2.805858 \\ 4.471975 \\ 5.450954 \\ 9.231214 \end{pmatrix} \begin{pmatrix} 9.231213674637974 + 0i \\ 2.805857676530958 + 0i \\ 5.450954011402351 + 0i \\ 4.471974637428714 + 0i \end{pmatrix}$$

Code

Listed on github