**Linear Algebra. Test 2. Variant 1.**

|  |  |  |  |
| --- | --- | --- | --- |
| First name | Last name | Group | Points#1 |
|  |  | BS1- |  |

I am, \_\_\_\_\_ (initials), confirming that I have read the following rules and agree to comply with them, that all solutions on this paper is my own work.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (signature)

Rules:

* no talking AT ALL is allowed during the exam and after it (if you are still in the room)
* when time is up, you have to put down your pen (pencil) and do NOT write anything else
* you can NOT leave your seat till the end of the test
* any electronic devices are not allowed

1. Find eigenvector of the circulant matrix *C* for the eigenvalue .

*(5 points)*



|  |  |  |  |
| --- | --- | --- | --- |
| First name | Last name | Group | Points#2 |
|  |  | BS1- |  |

1. Diagonalize this matrix by constructing its eigenvalue matrix ⋀ and its eigenvector matrix *S*.



Find *A* inverse.

*(5 points)*

|  |  |  |  |
| --- | --- | --- | --- |
| First name | Last name | Group | Points#3 |
|  |  | BS1- |  |

1. *A* is the matrix with full set of orthonormal eigenvectors. Prove that .

*(5 points)*

|  |  |  |  |
| --- | --- | --- | --- |
| First name | Last name | Group | Points#4 |
|  |  | BS1- |  |

1. Find all eigenvalues and eigenvectors of the cyclic permutation matrix *P*.



*(\*5 points\*)*