

Laboratory Work 5

Exercise 1:

1. Create the polynomial $p(s) = 3 + 2s + s^2$ and display it.
2. Define a rational fraction $q(s) = p(s)/(1 + 2s)$ and display its form.
3. Using `poly(0, 'x')`, create a polynomial variable x , then define $f(x) = x^3 - 4x + 2$.
4. Define a polynomial from its **roots**: $[-2, 0, 2]$.
5. Define another polynomial from its **coefficients** $[2, -3, 1, 4]$ in ascending order of degree.
6. Compute the characteristic polynomial of $A = \begin{pmatrix} 2 & 1 \\ -1 & 3 \end{pmatrix}$.

Exercise 2:

1. Define the polynomial $P(x) = x^3 - 5x^2 + 2x + 8$ then, find its zeros.
2. Verify one of the zeros.
3. Define another polynomial $R(x) = x^4 - 2x^3 - 7x^2 + 8x + 12$ and compute its zeros.

Exercise 3:

1. Define: $p1(s) = s^3 - 2s + 1$ and $p2(s) = 2s^2 + s + 3$.
Perform the following operations:
 $p1 + p2$, $p1 - p2$, $p1 \times p2$, $p1/p2$, $p1^3$.
2. Perform the Euclidean division of $p1$ by $p2$.
3. Compute the increasing powers division of $p1$ by $p2$.

Exercise 4:

Let $p(s) = s^4 - 3s^3 + 2s - 1$ and $q(s) = s^3 - s^2 + s - 1$. Perform the following:

1. Find the degree of p .
2. Compute its derivative.
3. Display its coefficients.
4. Get its variable name.
5. Factorize both p and q .
6. Compute:

Least Common Multiple of p and q .

Greatest Common Divisor of p and q .

7. Evaluate $p(s)$ for $s = 1.5$.
8. Simplify the rational fraction $r = P/q$.