Introduction to Scilab

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(The sequence of spoken tutorials to be listened/followed is same as that of exercise sets below.)

Matrix Operations

Solve the following examples on the Scilab Console as soon as the relevant topic is explained in the tutorial.

1. If A = $\begin{bmatrix} 1 & -1 & 0 \\ 2 & 3 & 1 \\ 4 & 1 & 5 \end{bmatrix}$
   Find $A(:, :)$
   Extract the second column of A
2. Determine the determinant and eigenvalues of the matrix, $A^2 + 2 * A$.
3. Define a 3x3 matrix A with all elements equal to 1. Multiply 1st and 2nd row with scalars, 3 and 4 respectively, and determine the determinant of the resultant matrix.
4. Represent the following linear system as a matrix equation. Solve the system using the inverse method:

$$\begin{aligned} x + y + 2z - w &= 3 \\ 2x + 5y - z - 9w &= -3 \\ 2x + y - z + 3w &= -11 \\ x - 3y + 2z + 7w &= -5 \end{aligned}$$

5. Try solving the above system using the backslash method.
6. Verify the solution from the previous question.
7. If A = $\begin{bmatrix} 2 & 3 & 1 \\ 4 & 6 & 5 \\ 1 & 3 & 6 \end{bmatrix}$
   Use a suitable sequence of row operations on A to bring A to upper triangular form.[1]

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[1] Upper triangular matrix: all elements below the North-West to South-East diagonal of the matrix are zero.