Practical: Plotting Graphs of Various Functions Using SciLab

Aim:

To plot the graphs of trigonometric functions (sin(x) and cos(x)), exponential function (e^x), absolute function (|x|), and inverse and hyperbolic functions (tanh(x) + acos(x)) using SciLab.

Materials Required:

- SciLab software (version 6.1 or higher)
- A computer system with SciLab installed

Theory (In Brief):

Graphing mathematical functions is an essential tool in understanding their behavior. SciLab provides built-in functions for plotting various mathematical functions such as trigonometric, exponential, absolute, inverse, and hyperbolic functions.

1. **Trigonometric Functions:** These functions describe the relationships between angles and sides of a right triangle. The sine function (sin(x)) and cosine function (cos(x)) oscillate between -1 and 1.

2. **Exponential Function (e^x):** The exponential function grows rapidly and is used in modeling population growth, compound interest, and various real-world phenomena.

3. **Absolute Function (|x|):** The absolute function returns the non-negative value of x and forms a V-shaped graph.

4. **Inverse and Hyperbolic Functions (tanh(x) + acos(x)):** The hyperbolic tangent function (tanh(x)) models growth similar to an S-curve, while the inverse cosine function (acos(x)) gives the angle whose cosine is x.

Formulas Required:

1. Trigonometric Functions: $y = \sin(x)$, $y = \cos(x)$
2. Exponential Function: $y = e^x$
3. Absolute Function: $y = |x|$
4. Hyperbolic & Inverse Functions: $y = \tanh(x) + \text{acos}(x)$

Result:

The graphs of trigonometric, exponential, absolute, inverse, and hyperbolic functions were successfully plotted using SciLab.