

23-10-2024

# Training Day – 25

## **\*Topic:\* Introduction to SciPy**

SciPy is an open-source Python library used for scientific and technical computing. It builds on NumPy, providing a wide range of functionalities for mathematics, science, and engineering. SciPy includes modules for optimization, integration, interpolation, eigenvalue problems, signal processing, linear algebra, and more. It is designed to work efficiently with NumPy arrays, allowing users to perform complex computations with minimal code.

- Explored optimization and integration functions in SciPy.
- Example: Used `scipy.integrate.quad` for numerical integration.
- SciPy builds on NumPy and provides additional modules for optimization, integration, and statistics.

## **Key Features of SciPy**

1. **Linear Algebra:** Tools for solving linear systems, eigenvalues, and singular value decompositions.
2. **Optimization:** Algorithms for optimization, including curve fitting and minimization.
3. **Integration:** Functions for numerical integration.
4. **Interpolation:** Methods for data interpolation.
5. **Statistics:** A wide range of statistical functions and random distributions.
6. **Signal Processing:** Tools for filtering, spectral analysis, and more.

## **EXAMPLE**

```
from scipy.integrate import quad
def func(x):
    return x**2
result, error = quad(func, 0, 1)
print("Integral of x^2 from 0 to 1:", result)
```