

PRACTICAL 9

Write python program to implement

- a) Different Linear algebra functions using Scipy.

PROGRAM:

```
import numpy as np
from scipy import linalg
#Create a matrix
A = np.array([[1, 2], [3, 4]])
print("Matrix A:")
print(A)
#Calculate the determinant
det_A = linalg.det(A)
print("Determinant of A:")
print(det_A)
#Calculate the inverse
inv_A = linalg.inv(A)
print("Inverse of A:")
print(inv_A)
#Solve a linear system of equations
b = np.array([5, 6])
x = linalg.solve(A, b)
print("Solution of Ax = b:")
print(x)
#Find the eigenvalues and eigenvectors
eigvals, eigvecs = linalg.eig(A)
print("Eigenvalues of A:")
print(eigvals)
print("Eigenvectors of A:")
print(eigvecs)
```

OUTPUT:

```
Matrix A:
[[1 2]
 [3 4]]
Determinant of A:
-2.0
Inverse of A:
[[-2.  1. ]
 [ 1.5 -0.5]]
Solution of Ax = b:
[-4.  4.5]
Eigenvalues of A:
[-0.37228132+0.j  5.37228132+0.j]
Eigenvectors of A:
[[-0.82456484 -0.41597356]
 [ 0.56576746 -0.90937671]]
```

b) PS: A Basic Flask Application to build a Simple REST API.

PROGRAM:

```
from flask import Flask, jsonify, request
from flask_restful import Resource, Api
app = Flask(__name__)
api = Api(app)
class Hello(Resource):
    def get(self):
        return jsonify({'message': 'hello world'})
    def post(self):
        data = request.get_json()
        return jsonify({'data': data}), 201
class Square(Resource):
    def get(self, num):
        return jsonify({'square': num**2})
api.add_resource(Hello, '/')
api.add_resource(Square, '/square/<int:num>')
if __name__ == '__main__':
    app.run(debug = True)
```

OUTPUT:

```
PS C:\Users\Lenovo> curl http://127.0.0.1:5000/
```

```

  StatusCode      : 200
  StatusDescription : OK
  Content          : {
                                "message": "hello world"
                                }
  RawContent       : HTTP/1.1 200 OK
  Connection       : close
  Content-Length   : 31
  Content-Type     : application/json
  Date             : Tue, 28 Mar 2023 05:52:32 GMT
  Server           : Werkzeug/2.2.3 Python/3.11.2
  {
    "message": "hello world"
  }
  Forms            : {}
  Headers          : {[Connection, close], [Content-Length, 31], [Content-Type, application/json], [Date, Tue, 28 Mar
2023 05:52:32 GMT]...}
  Images           : {}
  InputFields      : {}
  Links            : {}
  ParsedHtml       : System.__ComObject
  RawContentLength : 31
```

```
PS C:\Users\Lenovo> curl http://127.0.0.1:5000/square/8
```

```

  StatusCode      : 200
  StatusDescription : OK
  Content          : {
                                "square": 64
                                }
  RawContent       : HTTP/1.1 200 OK
  Connection       : close
  Content-Length   : 19
  Content-Type     : application/json
  Date             : Tue, 28 Mar 2023 05:55:44 GMT
  Server           : Werkzeug/2.2.3 Python/3.11.2
  {
    "square": 64
  }
  Forms            : {}
  Headers          : {[Connection, close], [Content-Length, 19], [Content-Type, application/json], [Date, Tue, 28 Mar
2023 05:55:44 GMT]...}
  Images           : {}
  InputFields      : {}
  Links            : {}
  ParsedHtml       : System.__ComObject
  RawContentLength : 19
```