I MSc (Mathematics and Statistics)   Max. MARKS: 500
SEMESTER II   Submission Date: 21 March 2021

Scientific Project

Write Python program using classes (without numpy libraries) to implement the following:

1. Get two vectors

2. Check whether the given vector x is

   (a) zero vector

   (b) unit vector

   (c) constant vector

   (d) distance from the origin is unit

3. For given two vectors $x_{m \times 1}$ and $y_{n \times 1}$ do the following

   (a) both dimensions equal $(m = n)$

   (b) If both dimension are equal, find $x + y, x - y, kx$, where k is a constant

   (c) If $m = n$, find $x.y$ (dot product)

   (d) If $m = n = 3$, find $x \times y$ (cross product)

   (e) Find the outer product of x and y

   (f) Convert the vector to unit vector

4. For the given vectors x and y of equal length

   (a) Find the projection of x on y

   (b) Check whether orthogonal

   (c) Angle between x and y

   (d) x and y are equal vectors

   (e) Check parallel

5. For the given vectors x, y and z of length 3

   (a) Find $x + y + z$

   (b) Find the box product

   (c) Triple vector product

Gaming Project

Write a Prime Doku Game using Python Language

1. From Google, identify what is the Sudoku Generator Algorithm, write a brief notes about it.

2. Also, identify what is Greedy algorithm and backtracing algorithm, write a brief notes about it.

3. After learning how to program Sudoku Generator and Sudoku solver, use your own ideas to generate Prime Doku,

4. A 9×9 Prime Doku is a Sudoku with all its entries prime number.

5. https://theory.tifr.res.in/ sgupta/sudoku/prime.html