St. Xavier's College (Autonomous), Kolkata

Department of Statistics

Assignment 1

MDTS 4113/SEM I/CORE3

Module 1

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Instructions for submission: write your name, roll number on every page. Submit the document in a pdf form to assignments.db.mdts@gmail.com.

1. If $\underline{v} + \underline{w} = \begin{pmatrix}5\\1\end{pmatrix}$ and $\underline{v} - \underline{w} = \begin{pmatrix}1\\5\end{pmatrix}$. compute and draw $\underline{v}$ and $\underline{w}$.
2. Restricted by $0 \leq c \leq 1$ and $0 \leq d \leq 1$, shade in all combinations $c\underline{v} + d\underline{w}$.
3. Find a unit vector $\underline{u}$ in the direction of $\underline{v} = (3, 7)$. Find a unit vector $\underline{e}$ that is perpendicular to $\underline{u}$. How many possibilities for $\underline{e}$?
4. Find the angle θ between these pairs of vectors:
   i. $\underline{u} = \begin{pmatrix}1\\\sqrt{3}\end{pmatrix}, \underline{v} = \begin{pmatrix}1\\0\end{pmatrix}$.
   ii. $\underline{u} = \begin{pmatrix}2\\2\\-1\end{pmatrix}, \underline{v} = \begin{pmatrix}2\\-1\\2\end{pmatrix}$.
5. Find two vectors v and w that are perpendicular to (1, 1, 0) and to each other.