

Handwritten HW 31

Page 365

24. All vectors are in \mathbb{R}^n . Mark the statement true or false (T/F). Justify your answer.

Not every orthogonal set in \mathbb{R}^n is linearly independent.

Solution:

26. All vectors are in \mathbb{R}^n . Mark the statement true or false (T/F). Justify your answer.

If a set $S = \{\mathbf{u}_1, \dots, \mathbf{u}_p\}$ has the property that $\mathbf{u}_i \cdot \mathbf{u}_j = 0$ whenever $i \neq j$, then S is an orthonormal set.

Solution:

28. All vectors are in \mathbb{R}^n . Mark the statement true or false (T/F). Justify your answer.

If the columns of an $m \times n$ matrix A are orthonormal, then the linear mapping $\mathbf{x} \mapsto A\mathbf{x}$ preserves lengths.

Solution:

30. All vectors are in \mathbb{R}^n . Mark the statement true or false (T/F). Justify your answer.

The orthogonal projection of \mathbf{y} onto \mathbf{v} is the same as the orthogonal projection of \mathbf{y} onto $c\mathbf{v}$ whenever $c \neq 0$.

Solution:

32. Mark the statement true or false (T/F). Justify your answer.

An orthogonal matrix is invertible.

Solution:

34. Suppose W is a subspace of \mathbb{R}^n spanned by n nonzero orthogonal vec-

tors. Explain why $W = \mathbb{R}^n$.

Solution: