
Content:

Declaration

Acknowledgment

Abstract

1) Vector and product of vectors

2) Scalar product of vectors

2.1) Geometrical interpretation

2.1.1) Case: Perpendicular vectors

2.1.2) Case: Co-directional vectors

2.1.3) Angle between two vectors

2.1.4) Length of a vector as scalar product

2.1.5) Properties of scalar product

Scalar projection

Associative law

Commutative law

Distributive law

3) Observation

4) Conclusion

5) Bibliography/References

1 Objective :

To write four compound statements by using two simple mathematical statements.

2 Procedure/ Explanation :

In any triangle ABC,

$$p : a = b \cos C + c \cos B$$

$$q : b = c \cos A + a \cos C$$

Here, p and q are two simple statements. Both of them are true mathematical statements regarding projection law in a triangle. The compound statements that can be formed using statements p and q are as follows:

2.1 $p \wedge q$

$$a = b \cos C + c \cos B \text{ AND } b = c \cos A + a \cos C$$

Truth table:

p	q	$p \wedge q$
T	T	T

2.2 $p \vee q$

$$a = b \cos C + c \cos B \text{ OR } b = c \cos A + a \cos C$$

Truth table:

p	q	$p \vee q$
T	T	T

2.3 $\sim p \vee q$

$$a \neq b \cos C + c \cos B \text{ OR } b = c \cos A + a \cos C$$

Truth table:

$\sim p$	q	$\sim p \vee q$
F	T	T

2.4 $p \Rightarrow \sim q$

$$\text{IF } a = b \cos C + c \cos B, \text{ THEN } b \neq c \cos A + a \cos C$$

Truth table:

p	$\sim q$	$p \Rightarrow \sim q$
T	F	F

3 Observation:

For any two true simple statements p and q , the compound statement $p \Rightarrow \sim q$ is found to be false.

4 Conclusion:

Two simple mathematical statements can be used to form a number of compound statements by using the logical connec-

tives conjunction (\wedge), disjunction (\vee), negation (\neg), implication (\Rightarrow) and equivalence (\Leftrightarrow). The resultant statements may be either 'True' or 'False' depending upon the original simple statements.

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