

Chapter 2

P.2-1 (a) $\bar{a}_A = \frac{\bar{A}}{A} = \frac{\bar{a}_x + \bar{a}_y 2 - \bar{a}_z 3}{\sqrt{1^2 + 2^2 + (-3)^2}} = \frac{1}{\sqrt{14}} (\bar{a}_x + \bar{a}_y 2 - \bar{a}_z 3)$

(b) $|\bar{A} - \bar{B}| = |\bar{a}_x + \bar{a}_y 6 - \bar{a}_z 4| = \sqrt{1^2 + 6^2 + 4^2} = \sqrt{53}$

(c) $\bar{A} \cdot \bar{B} = 0 + 2(-4) + (-3) = -11$

(d) $\theta_{AB} = \cos^{-1}(\bar{A} \cdot \bar{B} / AB) = \cos^{-1}(-11 / \sqrt{14} \sqrt{17}) = 135.5^\circ$

(e) $\bar{A} \cdot \bar{a}_C = \bar{A} \cdot \frac{\bar{C}}{C} = \bar{A} \cdot \frac{1}{\sqrt{29}} (\bar{a}_x 5 - \bar{a}_z 2) = \frac{11}{\sqrt{29}}$

(f) $\bar{A} \times \bar{C} = -\bar{a}_x 4 - \bar{a}_y 13 - \bar{a}_z 10$

(g) $\bar{A} \cdot (\bar{B} \times \bar{C}) = (\bar{A} \times \bar{B}) \cdot \bar{C} = -42$

(h) $(\bar{A} \times \bar{B}) \times \bar{C} = \bar{B}(\bar{A} \cdot \bar{C}) - \bar{A}(\bar{C} \cdot \bar{B}) = \bar{a}_x 2 - \bar{a}_y 40 + \bar{a}_z 5$
 $\bar{A} \times (\bar{B} \times \bar{C}) = \bar{B}(\bar{A} \cdot \bar{C}) - \bar{C}(\bar{A} \cdot \bar{B}) = \bar{a}_x 35 + \bar{a}_y 44 - \bar{a}_z 11$

P.2-2 Position vectors of the three corners:

$\overline{OP}_1 = \bar{a}_y - \bar{a}_z 2$, $\overline{OP}_2 = \bar{a}_x 4 - \bar{a}_y - \bar{a}_z 3$, $\overline{OP}_3 = \bar{a}_x 6 + \bar{a}_y 2 + \bar{a}_z 5$

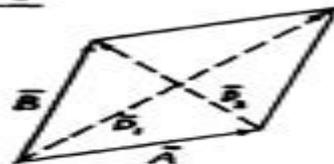
Vectors representing the three sides of the triangle:

$\overline{P_1 P_2} = \overline{OP}_2 - \overline{OP}_1 = \bar{a}_x 4 - \bar{a}_z$, $\overline{P_2 P_3} = \bar{a}_x 2 + \bar{a}_y + \bar{a}_z 8$, $\overline{P_3 P_1} = -\bar{a}_x 6 - \bar{a}_y - \bar{a}_z$

(a) $\overline{P_1 P_2} \cdot \overline{P_2 P_3} = 0$. $\therefore \Delta P_1 P_2 P_3$ is a right triangle.

(b) Area of triangle = $\frac{1}{2} |\overline{P_1 P_2} \times \overline{P_2 P_3}| = 17.1$

P.2-3



$\bar{D}_1 = \bar{B} + \bar{A}$, $\bar{D}_2 = \bar{B} - \bar{A}$

$\bar{D}_1 \cdot \bar{D}_2 = (\bar{B} + \bar{A}) \cdot (\bar{B} - \bar{A})$
 $= \bar{B} \cdot \bar{B} - \bar{A} \cdot \bar{A} = 0$

$\therefore \bar{D}_1 \perp \bar{D}_2$

P.2-4 From $\bar{A} \cdot \bar{B} = \bar{A} \cdot \bar{C}$, we have $\bar{A} \cdot (\bar{B} - \bar{C}) = 0$. (1)

From $\bar{A} \times \bar{B} = \bar{A} \times \bar{C}$, we have $\bar{A} \times (\bar{B} - \bar{C}) = 0$. (2)

(1) implies $\bar{A} \perp (\bar{B} - \bar{C})$ and (2) implies $\bar{A} \parallel (\bar{B} - \bar{C})$. Since \bar{A} is not a null vector, (1) and (2) cannot hold at the same time unless $(\bar{B} - \bar{C})$ is a null vector. Thus, $\bar{B} - \bar{C} = 0$ or $\bar{B} = \bar{C}$.

P.2-5 $\bar{a}_A \cdot \bar{a}_B = \cos(\alpha - \beta) = \cos \alpha \cos \beta + \sin \alpha \sin \beta$.

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3D IC and RF SiPs: Advanced Stacking and Planar Solutions for 5G Mobility Lih-Tyng Hwang, Tzyy-Sheng Jason Horng, 2018-03-29 An interdisciplinary guide to enabling technologies for 3D ICs and 5G mobility covering packaging design to product life and reliability assessments Features an interdisciplinary approach to the enabling technologies and hardware for 3D ICs and 5G mobility Presents statistical treatments and examples with tools that are easily accessible such as Microsoft's Excel and Minitab Fundamental design topics such as electromagnetic design for logic and RF passives centric circuits are explained in detail Provides chapter wise review questions and powerpoint slides as teaching tools

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Field and Wave Electromagnetics Cheng,David K. Cheng Cheng,1989-01-01 Referativnyi zhurnal ,1976 Technical Information Pilot ,1949 Canadian Journal of Physics ,1969 Syracuse University Faculty-staff Publications and Creative Work Syracuse University. Archives,1963 *Network Analysis* Mac Elwyn Van Valkenburg,1964 **Faculty Publications** Syracuse University. Library,1965 Mathematica Scandinavica ,1960 **Applications of Walsh Functions** ,1973

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