

Find the area of triangle with vertices (1, 0, 2), (3, 2, 1), (2, 1, 3). [99中山機電III 1 (b)]

[解]設 A(1, 0, 2), B(3, 2, 1), C(2, 1, 3) $\Rightarrow \overrightarrow{AB} = 2\mathbf{i} + 2\mathbf{j} - \mathbf{k}$, $\overrightarrow{AC} = \mathbf{i} + \mathbf{j} + \mathbf{k}$

$$\overrightarrow{AB} \times \overrightarrow{AC} = \begin{vmatrix} \mathbf{i} & \mathbf{j} & \mathbf{k} \\ 2 & 2 & -1 \\ 1 & 1 & 1 \end{vmatrix} = (2\mathbf{i} + 2\mathbf{k} - \mathbf{j}) - (2\mathbf{k} - \mathbf{i} + 2\mathbf{j}) = 3\mathbf{i} - 3\mathbf{j}$$

$$\Delta ABC = \frac{1}{2} |\overrightarrow{AB} \times \overrightarrow{AC}| = \frac{1}{2} \sqrt{3^2 + (-3)^2} = \frac{3\sqrt{2}}{2}$$