

$$\mathbf{A} \times \mathbf{B} = \begin{vmatrix} \mathbf{i} & \mathbf{j} & \mathbf{k} & \mathbf{i} & \mathbf{j} \\ A_x & A_y & A_z & A_x & A_y \\ B_x & B_y & B_z & B_x & B_y \end{vmatrix}$$

The diagram illustrates the calculation of the vector cross product $\mathbf{A} \times \mathbf{B}$ using a 5x3 determinant. The determinant is written as a 5x3 matrix with a vertical bar. The first three columns are the standard unit vectors $\mathbf{i}, \mathbf{j}, \mathbf{k}$ and the components A_x, A_y, A_z of vector \mathbf{A} . The last two columns are the components B_x, B_y of vector \mathbf{B} , repeated from the first two columns. The matrix is:

$$\begin{vmatrix} \mathbf{i} & \mathbf{j} & \mathbf{k} & \mathbf{i} & \mathbf{j} \\ A_x & A_y & A_z & A_x & A_y \\ B_x & B_y & B_z & B_x & B_y \end{vmatrix}$$
 The matrix is overlaid with two sets of diagonal bands: a light red band running from the top-left to the bottom-right, and a light blue band running from the top-right to the bottom-left. These bands intersect to form a grid of squares. The first three columns are highlighted by the red band, and the last two columns are highlighted by the blue band. The determinant is equal to the sum of the products of the elements in the first three columns, minus the sum of the products of the elements in the last two columns.