Expansion by Cofactors

Let A be a square matrix of order n. Then the determinant of A is

$$det(A) = |A| = \sum_{j=1}^{n} a_{ij}C_{ij} = a_{i1}C_{i1} + a_{i2}C_{i2} + \cdots + a_{in}C_{in} \qquad i^{th} \text{ row expansion}$$

or

$$det(A) = |A| = \sum_{i=1}^{n} a_{ij}C_{ij} = a_{1j}C_{1j} + a_{2j}C_{2j} + \cdots + a_{nj}C_{nj} \qquad j^{th} \text{ column expansion}$$