Hexagonal:

$$\cos\rho = \frac{h_1h_2 + k_1k_2 + \frac{1}{2}(h_1k_2 + h_2k_1) + (3a^2/4c^2)l_1l_2}{\sqrt{\{[h_1^2 + k_1^2 + h_1k_1 + (3a^2/4c^2)l_1^2][h_2^2 + k_2^2 + h_2k_2 + (3a^2/4c^2)l_2^2]\}}}.$$

Rhombohedral:

$$\cos\rho = (a^4 d_1 d_2/V^2)\,[\sin^2\alpha(h_1h_2 + k_1k_2 + l_1l_2) + (\cos^2\alpha - \cos\alpha)(k_1l_2 + k_2l_1 + l_1h_2 + l_2h_1 + h_1k_2 + h_2k_1)].$$

Monoclinic:

$$\cos\rho = \frac{d_1d^2}{\sin^2\beta}\left[\frac{h_1h_2}{a^2} + \frac{k_1k_2\sin^2\beta}{b^2} + \frac{l_1l_2}{c^2} - \frac{(l_1h_2 + l_2h_1)\cos\beta}{ac}\right].$$

## A4.3 Volumes of unit cells

Orthorhombic:

$$V = abc.$$

(Tetragonal: $a = b$; cubic: $a = b = c$.)

Hexagonal:

$$V = \sqrt{(3)}a^2c/2 = 0.866\, a^2c.$$

Rhombohedral:

$$V = a^3\sqrt{(1 - 3\cos^2\alpha + 2\cos^3\alpha)}.$$

Monoclinic:

$$V = abc\sin\beta.$$