

List of abbreviations

$$\begin{aligned}A_1 &= 4 \left(2t^2 + tU + U (J - W) \right) + (J + t - U - W)^2 \\A_2 &= J^2 + 27t^2 + 2J (U - W) + (U - W)^2 \\A_3 &= J^2 + 36t^2 + 4t (U - W) + (U - W)^2 + 2J (2t + U - W) \\A_4 &= J^2 + 9t^2 - 2t (U - W) + (U - W)^2 - 2J (t - U + W) \\A_5 &= 4 \left(8t^2 - 2tU + U (J - W) \right) + (-J + 2t + U + W)^2 \\A_6 &= J - 2U - 7W + 2\sqrt{A_2} \cos(\Theta_1) \\A_7 &= -J + 2U + 7W + \sqrt{A_2} \left(\cos(\Theta_1) - \sqrt{3} \sin(\Theta_1) \right) \\A_8 &= -J + 2U + 7W + \sqrt{A_2} \left(\cos(\Theta_1) + \sqrt{3} \sin(\Theta_1) \right)\end{aligned}$$

(1)

$$\Theta_1 = \frac{\arccos\left(\frac{(J+U-W)^3}{A_2^{\frac{3}{2}}}\right)}{3}$$