$P := P_2 \cdot x^2 + P_1 \cdot x + P_0$

$$P := P_2 x^2 + P_1 x + P_0 \tag{1}$$

$Q_1 := Q_{11} \cdot x + Q_{10}$

$$Q_1 := Q_{11} x + Q_{10} \tag{2}$$

$Q_2 := Q_{21} \cdot x + Q_{20}$

$$Q_2 := Q_{21} x + Q_{20} \tag{3}$$

$\mathrm{Q} := \mathrm{collect}(\mathrm{Q}_1 \cdot Q_2, x)$

$$Q := Q_{11} Q_{21} x^2 + (Q_{10} Q_{21} + Q_{11} Q_{20}) x + Q_{10} Q_{20} \tag{4}$$

$R := \mathrm{R}_2 \cdot x^2 + R_1 \cdot x + R_0$

$$R := R_2 x^2 + R_1 x + R_0 \tag{5}$$

$g := collect(P \cdot Q_1, x)$

$$g := P_2 Q_{11} x^3 + (P_1 Q_{11} + P_2 Q_{10}) x^2 + (P_0 Q_{11} + P_1 Q_{10}) x + P_0 Q_{10} \tag{6}$$

$$g := P_2 Q_{11} x^3 + (P_1 Q_{11} + P_2 Q_{10}) x^2 + (P_0 Q_{11} + P_1 Q_{10}) x + P_0 Q_{10} \tag{7}$$

$h := collect\left(\frac{Q_2 \cdot R}{4 \cdot \Delta}, x\right)$

$$h := \frac{Q_{21} R_2 x^3}{4\Delta} + \frac{(Q_{20} R_2 + Q_{21} R_1) x^2}{4\Delta} + \frac{(Q_{20} R_1 + Q_{21} R_0) x}{4\Delta} + \frac{Q_{20} R_0}{4\Delta} \tag{8}$$

$T := [coeff(g, x, 2) \cdot coeff(h, x, 0) + coeff(g, x, 0) \cdot coeff(h, x, 2), coeff(g, x, 3) \cdot coeff(h, x, 0) + coeff(g, x, 0) \cdot coeff(h, x, 3), -coeff(g, x, 3) \cdot coeff(h, x, 1) - coeff(g, x, 1) \cdot coeff(h, x, 3), 4]$

$T :=$ (9)

$$\left[\frac{(P_1 Q_{11} + P_2 Q_{10}) Q_{20} R_0}{4\Delta} + \frac{P_0 Q_{10} (Q_{20} R_2 + Q_{21} R_1)}{4\Delta} \quad \frac{P_2 Q_{11} Q_{20} R_0}{4\Delta} + \frac{P_0 Q_{10} Q_{21} R_2}{4\Delta} \quad - \cdots \right]$$

$\phi_1 := -\frac{1}{16 \cdot \Delta} \left(coeff(P, x, 2)^2 \cdot coeff(Q, x, 0) \cdot coeff(R, x, 0) + coeff(P, x, 2) \cdot coeff(P, x, 0) \cdot (coeff(Q, x, 2) \cdot coeff(R, x, 0) + coeff(Q, x, 1) \cdot coeff(R, x, 1) + coeff(Q, x, 0) \cdot coeff(R, x, 2)) + coeff(P, x, 0)^2 \cdot coeff(Q, x, 2) \cdot coeff(R, x, 2) \right)$

$$\phi_1 := -\frac{P_2^2 Q_{10} Q_{20} R_0 + P_2 P_0 (Q_{11} Q_{21} R_0 + (Q_{10} Q_{21} + Q_{11} Q_{20}) R_1 + Q_{10} Q_{20} R_2) + P_0^2 Q_{11} Q_{21} R_2}{16\Delta} \tag{10}$$

$\phi_2 := -\frac{1}{16 \cdot \Delta} \left(coeff(Q, x, 2)^2 \cdot coeff(P, x, 0) \cdot coeff(R, x, 0) + coeff(Q, x, 2) \cdot coeff(Q, x, 0) \cdot (coeff(P, x, 2) \cdot coeff(R, x, 0) + coeff(P, x, 1) \cdot coeff(R, x, 1) + coeff(P, x, 0) \cdot coeff(R, x, 2)) + coeff(Q, x, 0)^2 \cdot coeff(P, x, 2) \cdot coeff(R, x, 2) \right)$

$$\phi_2 := -\frac{Q_{11}^2 Q_{21}^2 P_0 R_0 + Q_{11} Q_{21} Q_{10} Q_{20} (P_0 R_2 + P_1 R_1 + P_2 R_0) + Q_{10}^2 Q_{20}^2 P_2 R_2}{16\Delta} \tag{11}$$

$\phi_3 := -\frac{1}{16 \cdot \Delta} \left(coeff(R, x, 2)^2 \cdot coeff(Q, x, 0) \cdot coeff(P, x, 0) + coeff(R, x, 2) \cdot coeff(R, x, 0) \cdot (coeff(Q, x, 2)$

$$\cdot coeff(P,x,0) + coeff(Q,x,1)\cdot coeff(P,x,1) + coeff(Q,x,0)\cdot coeff(P,x,2)) + coeff(R,x,0)^2\cdot coeff(Q, x,2)\cdot coeff(P,x,2))$$

$$\phi_3 := -\frac{R_2^2 Q_{10} Q_{20} P_0 + R_2 R_0 (Q_{11} Q_{21} P_0 + (Q_{10} Q_{21} + Q_{11} Q_{20}) P_1 + Q_{10} Q_{20} P_2) + R_0^2 Q_{11} Q_{21} P_2}{16\,\Delta} \quad (12)$$

$$C := \begin{bmatrix} \text{coeff(P, x, 2)} & coeff(Q,x,2) & coeff(R,x,2) & 0 \\ -coeff(P,x,1) & -coeff(Q,x,1) & -coeff(R,x,1) & 0 \\ -coeff(P,x,0) & -coeff(Q,x,0) & -coeff(R,x,0) & 0 \\ \phi_1 & \phi_2 & \phi_3 & -\frac{1}{16\cdot\Delta} \end{bmatrix}$$

$$C := \quad (13)$$

$$\begin{bmatrix} P_2 & \cdots \\ -P_1 & \cdots \\ -P_0 & \cdots \\ -\frac{P_2^2 Q_{10} Q_{20} R_0 + P_2 P_0 (Q_{11} Q_{21} R_0 + (Q_{10} Q_{21} + Q_{11} Q_{20}) R_1 + Q_{10} Q_{20} R_2) + P_0^2 Q_{11} Q_{21}}{16\,\Delta} & \cdots \end{bmatrix}$$

$$C := \quad (14)$$

$$\begin{bmatrix} P_2 & \cdots \\ -P_1 & \cdots \\ -P_0 & \cdots \\ -\frac{P_2^2 Q_{10} Q_{20} R_0 + P_2 P_0 (Q_{11} Q_{21} R_0 + (Q_{10} Q_{21} + Q_{11} Q_{20}) R_1 + Q_{10} Q_{20} R_2) + P_0^2 Q_{11} Q_{21}}{16\,\Delta} & \cdots \end{bmatrix}$$

$$\text{W} := \text{T} \bullet \text{C}$$

$$W := \quad (15)$$

$$\begin{bmatrix} \left(\frac{(P_1 Q_{11} + P_2 Q_{10}) Q_{20} R_0}{4\,\Delta} + \frac{P_0 Q_{10} (Q_{20} R_2 + Q_{21} R_1)}{4\,\Delta}\right) P_2 - \left(\frac{P_2 Q_{11} Q_{20} R_0}{4\,\Delta} + \frac{P_0 Q_{10}}{4\,\Delta}\right. & \cdots \end{bmatrix}$$

$$simplify(-4\cdot\Delta\cdot W)$$

$$\begin{bmatrix} 0 & (Q_{10}^2 R_2 - Q_{10} Q_{11} R_1 + Q_{11}^2 R_0)\,(P_0 Q_{21}^2 - P_1 Q_{20} Q_{21} + P_2 Q_{20}^2) & 0 & 1 \end{bmatrix} \quad (16)$$