Model with exposed class in mosquitoes population and force of infection from recovered human to susceptible mosquitoes.

$$\Lambda + q * z^* + \eta * X^* - \lambda_h^* * x^* - (d_h + \eta) * x^* == 0$$

$$\lambda_h^* * x^* + \theta * Y^* - (\theta + d_h + \delta_h + \gamma_h) * y^* == 0$$

$$\gamma_h * y^* + \eta * Z^* - (\eta + d_h + q) * z^* == 0$$

$$\eta * x^* + q * Z^* - (k + d_h + \eta) * X^* == 0$$

$$k * X^* + \theta * y^* - (\theta + d_h + \delta_h + \gamma_h) * Y^* == 0$$

$$\gamma_h * Y^* + \eta * z^* - (\eta + d_h + q) * Z^* == 0$$

$$\phi - \lambda_v^* * l^* - dv * l^* == 0$$

$$\lambda_v^* * l^* - (d_v + \sigma) * n^* == 0$$

$$\sigma * n^* - dv * m^* == 0$$

$$\phi - d_v * N_v^* - \sigma * n^* == 0$$

$$\lambda_h^* = b\,\frac{\alpha_{vh}\,m^*}{N_{hh}^*} = \beta_h\,\frac{m^*}{N_{hh}^*},\quad \beta_h = b\,\alpha_{vh},\quad \lambda_v^* = b\,\frac{\alpha_{hv}\,(y^* + r * z^*)}{N_{hh}^*} = \beta_v\,\frac{(y^* + r * z^*)}{N_{hh}^*},\quad \beta_v = b\,\alpha_{hv},\quad p = \theta$$

In[2]:=
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Solve[{Λ + q * z^* + η * X^* - λ_h^* * x^* - (d_h + η) * x^* == 0, λ_h^* * x^* + θ * Y^* - (θ + d_h + δ_h + γ_h) * y^* == 0,
  γ_h * y^* + η * Z^* - (η + d_h + q) * z^* == 0, η * x^* + q * Z^* - (k + d_h + η) * X^* == 0,
k * X^* + θ * y^* - (θ + d_h + δ_h + γ_h) * Y^* == 0,
γ_h * Y^* + η * z^* - (η + d_h + q) * Z^* == 0}, {x^*, y^*, z^*, X^*, Y^*, Z^*}]
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In[12]:=
$$x^* =$$

$$\begin{aligned}
&\Big(\Lambda\,\Big(d_h^5 + d_h^4\,\big(k + 2q + 3\eta + 2\theta + 2\gamma_h + 2\delta_h\big) + d_h^3\,\big(2kq + q^2 + 2k\eta + 4q\eta + 2\eta^2 + 2k\theta + 4q\theta + 6\eta\theta + \\
&\qquad \gamma_h^2 + 2\,\big(k + 2q + 3\eta + \theta\big)\,\delta_h + \delta_h^2 + 2\,\gamma_h\,\big(k + 2q + 3\eta + \theta + \delta_h\big)\big) + \\
&\qquad d_h^2\,\big(kq^2 + 2kq\eta + q^2\eta + 2q\eta^2 + 4kq\theta + 2q^2\theta + 4k\eta\theta + 8q\eta\theta + 4\eta^2\theta + \big(k + 2q + 3\eta\big)\,\gamma_h^2 + \\
&\qquad\quad 2\,\big(q^2 + 4q\eta + 2\eta^2 + 2q\theta + 3\eta\theta + k\,\big(2q + 2\eta + \theta\big)\big)\,\delta_h + \big(k + 2q + 3\eta\big)\,\delta_h^2 + \\
&\qquad\quad \gamma_h\,\big(3kq + 2q^2 + 4k\eta + 8q\eta + 4\eta^2 + 2k\theta + 4q\theta + 6\eta\theta + 2\,\big(k + 2q + 3\eta\big)\,\delta_h\big)\big) + \\
&\qquad d_h\,\big(2q\,(k + \eta)\,\big(q + 2\eta\big)\,\theta + \big(q^2 + 4q\eta + 2\eta^2 + k\,\big(q + 2\eta\big)\big)\,\gamma_h^2 + \\
&\qquad\quad 2\,\big(2\eta^2\theta + q^2\,(\eta + \theta) + 2q\eta\,\big(\eta + 2\theta\big) + k\,\big(q^2 + 2\eta\theta + 2q\,(\eta + \theta)\big)\big)\,\delta_h + \\
&\qquad\quad \big(q^2 + 4q\eta + 2\eta^2 + 2k\,(q + \eta)\big)\,\delta_h^2 + \gamma_h\,\big(4\eta^2\theta + 2q^2\,(\eta + \theta) + 4q\eta\,\big(\eta + 2\theta\big) + \\
&\qquad\quad k\,\big(q^2 + 4\eta\theta + 3q\,(\eta + \theta)\big) + \big(3kq + 2q^2 + 4k\eta + 8q\eta + 4\eta^2\big)\,\delta_h\big)\big) + \\
&\qquad q\,\big(\eta\,\big(k + q + 2\eta\big)\,\gamma_h^2 + (k + \eta)\,\big(q + 2\eta\big)\,\delta_h\,\big(2\theta + \delta_h\big) + \\
&\qquad\quad \gamma_h\,\big(\big(k + 2\eta\big)\,\big(q + 2\eta\big)\,\theta + \big(2\eta\,\big(q + 2\eta\big) + k\,\big(q + 3\eta\big)\big)\,\delta_h\big)\big)\big)\Big) \Big/ \\
&\Big(d_h^6 + d_h^5\,\big(k + 2q + 4\eta + 2\theta + 2\gamma_h + 2\delta_h + (\lambda_h)^*\big) + d_h^4\,\big(2kq + q^2 + 3k\eta + 6q\eta + 4\eta^2 + \\
&\qquad 2k\theta + 4q\theta + 8\eta\theta + \gamma_h^2 + \delta_h^2 + k\,(\lambda_h)^* + 2q\,(\lambda_h)^* + 3\eta\,(\lambda_h)^* + 2\theta\,(\lambda_h)^* + \\
&\qquad 2\delta_h\,\big(k + 2q + 4\eta + \theta + (\lambda_h)^*\big) + 2\gamma_h\,\big(k + 2q + 4\eta + \theta + \delta_h + (\lambda_h)^*\big)\big) + \\
&\quad q\,\delta_h\,\big(\big(q + 2\eta\big)\,\big(2\theta + \delta_h\big)\,\big(k\eta + (k + \eta)\,(\lambda_h)^*\big) + \eta\,\gamma_h\,\big(k\,\big(q + 2\eta\big) + \big(2k + q + 2\eta\big)\,(\lambda_h)^*\big)\big) + \\
&\quad d_h^3\,\big(kq^2 + 4kq\eta + 2q^2\eta + 2k\eta^2 + 4q\eta^2 + 4kq\theta + 2q^2\theta + 6k\eta\theta + 12q\eta\theta + 8\eta^2\theta + \\
&\qquad 2kq\,(\lambda_h)^* + q^2\,(\lambda_h)^* + 2k\eta\,(\lambda_h)^* + 4q\eta\,(\lambda_h)^* + 2\eta^2\,(\lambda_h)^* + 2k\theta\,(\lambda_h)^* + \\
&\qquad 4q\theta\,(\lambda_h)^* + 6\eta\theta\,(\lambda_h)^* + \gamma_h^2\,\big(k + 2q + 4\eta + (\lambda_h)^*\big) + \delta_h^2\,\big(k + 2q + 4\eta + (\lambda_h)^*\big) + \\
&\qquad 2\delta_h\,\big(q^2 + 6q\eta + 4\eta^2 + 2q\theta + 4\eta\theta + k\,\big(2q + 3\eta + \theta\big) + \big(k + 2q + 3\eta + \theta\big)\,(\lambda_h)^*\big) +
\end{aligned}$$

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\begin{aligned}
&\gamma_h \left(3\,k\,q + 2\,q^2 + 6\,k\,\eta + 12\,q\,\eta + 8\,\eta^2 + 2\,k\,\theta + 4\,q\,\theta + 8\,\eta\,\theta + \right.\\
&\qquad \left.\left(2\,k + 3\,q + 6\,\eta + 2\,\theta\right)\,(\lambda_h)^* + 2\,\delta_h\left(k + 2\,q + 4\,\eta + (\lambda_h)^*\right)\right) + \\
&d_h^2\left(k\,q^2\,\eta + 2\,k\,q\,\eta^2 + 2\,k\,q^2\,\theta + 8\,k\,q\,\eta\,\theta + 4\,q^2\,\eta\,\theta + 4\,k\,\eta^2\,\theta + 8\,q\,\eta^2\,\theta + k\,q^2\,(\lambda_h)^* + \right.\\
&\quad 2\,k\,q\,\eta\,(\lambda_h)^* + q^2\,\eta\,(\lambda_h)^* + 2\,q\,\eta^2\,(\lambda_h)^* + 4\,k\,q\,\theta\,(\lambda_h)^* + 2\,q^2\,\theta\,(\lambda_h)^* + 4\,k\,\eta\,\theta\,(\lambda_h)^* + \\
&\quad 8\,q\,\eta\,\theta\,(\lambda_h)^* + 4\,\eta^2\,\theta\,(\lambda_h)^* + \gamma_h^2\left(q^2 + 6\,q\,\eta + 4\,\eta^2 + k\left(q + 3\,\eta\right) + \left(k + q + 3\,\eta\right)\,(\lambda_h)^*\right) + \\
&\quad \delta_h^2\left(2\,k\,q + q^2 + 3\,k\,\eta + 6\,q\,\eta + 4\,\eta^2 + \left(k + 2\,q + 3\,\eta\right)\,(\lambda_h)^*\right) + \\
&\quad 2\,\delta_h\left(2\,q^2\,\eta + 4\,q\,\eta^2 + q^2\,\theta + 6\,q\,\eta\,\theta + 4\,\eta^2\,\theta + k\left(q^2 + 4\,q\,\eta + 2\,\eta^2 + 2\,q\,\theta + 3\,\eta\,\theta\right) + \right.\\
&\qquad \left.\left(q^2 + 4\,q\,\eta + 2\,\eta^2 + 2\,q\,\theta + 3\,\eta\,\theta + k\left(2\,q + 2\,\eta + \theta\right)\right)\,(\lambda_h)^*\right) + \\
&\quad \gamma_h\left(k\,q^2 + 6\,k\,q\,\eta + 4\,q^2\,\eta + 4\,k\,\eta^2 + 8\,q\,\eta^2 + 3\,k\,q\,\theta + 2\,q^2\,\theta + 6\,k\,\eta\,\theta + 12\,q\,\eta\,\theta + \right.\\
&\qquad 8\,\eta^2\,\theta + \left(q^2 + 6\,q\,\eta + 4\,\eta^2 + 3\,q\,\theta + 6\,\eta\,\theta + 2\,k\left(q + 2\,\eta + \theta\right)\right)\,(\lambda_h)^* + \\
&\qquad \left.\delta_h\left(3\,k\,q + 2\,q^2 + 6\,k\,\eta + 12\,q\,\eta + 8\,\eta^2 + \left(2\,k + 3\,q + 6\,\eta\right)\,(\lambda_h)^*\right)\right) + \\
&d_h\left(2\,q\left(q + 2\,\eta\right)\theta\,(k\,\eta + (k + \eta)\,(\lambda_h)^*) + 2\,\eta\,\gamma_h^2\left(k\,(q + \eta) + q\left(q + 2\,\eta\right) + (k + q + \eta)\,(\lambda_h)^*\right) + \right.\\
&\quad \delta_h^2\left(2\,q\,\eta\left(q + 2\,\eta\right) + k\left(q^2 + 4\,q\,\eta + 2\,\eta^2\right) + \left(q^2 + 4\,q\,\eta + 2\,\eta^2 + 2\,k\,(q + \eta)\right)\,(\lambda_h)^*\right) + \\
&\quad 2\,\delta_h\left(2\,q\,\eta\left(q + 2\,\eta\right)\theta + k\left(2\,\eta^2\,\theta + q^2\,(\eta + \theta) + 2\,q\,\eta\left(\eta + 2\,\theta\right)\right) + \right.\\
&\qquad \left.\left(2\,\eta^2\,\theta + q^2\,(\eta + \theta) + 2\,q\,\eta\left(\eta + 2\,\theta\right) + k\left(q^2 + 2\,\eta\,\theta + 2\,q\,(\eta + \theta)\right)\right)\,(\lambda_h)^*\right) + \\
&\quad \gamma_h\left(\left(q + 2\,\eta\right)\left(2\,k\,\eta\,\theta + 4\,q\,\eta\,\theta + k\,q\,(\eta + \theta)\right) + \left(2\,k + q + 2\,\eta\right)\left(2\,\eta\,\theta + q\,(\eta + \theta)\right)\,(\lambda_h)^* + \right.\\
&\qquad \left.\left.\delta_h\left(4\,q\,\eta\left(q + 2\,\eta\right) + k\left(q^2 + 6\,q\,\eta + 4\,\eta^2\right) + \left(q^2 + 6\,q\,\eta + 4\,\eta^2 + 2\,k\left(q + 2\,\eta\right)\right)\,(\lambda_h)^*\right)\right)\right)\\
y^* = &\left(\Lambda\left(d_h^4\,(\lambda_h)^* + d_h^3\left(k + 2\,q + 3\,\eta + \theta + \gamma_h + \delta_h\right)\,(\lambda_h)^* + d_h^2\left(k\,\eta\,\theta + \left(2\,k\,q + q^2 + 2\,k\,\eta + \right.\right.\right.\right.\\
&\qquad \left.\left.\left.\left.4\,q\,\eta + 2\,\eta^2 + k\,\theta + 2\,q\,\theta + 3\,\eta\,\theta + \left(k + 2\,q + 3\,\eta\right)\,\gamma_h + \left(k + 2\,q + 3\,\eta\right)\,\delta_h\right)\,(\lambda_h)^*\right) + \right.\\
&\quad d_h\left(2\,k\,\eta\,(q + \eta)\,\theta + \left(k\,q^2 + 2\,k\,q\,\eta + q^2\,\eta + 2\,q\,\eta^2 + 2\,k\,q\,\theta + q^2\,\theta + 2\,k\,\eta\,\theta + 4\,q\,\eta\,\theta + 2\,\eta^2\,\theta + \right.\\
&\qquad \left.\left.\left(q^2 + 4\,q\,\eta + 2\,\eta^2 + k\left(q + 2\,\eta\right)\right)\,\gamma_h + \left(q^2 + 4\,q\,\eta + 2\,\eta^2 + 2\,k\,(q + \eta)\right)\,\delta_h\right)\,(\lambda_h)^*\right) + \\
&\quad \left.q\left(k\,\eta\left(q + 2\,\eta\right)\theta + \left(\eta\left(k + q + 2\,\eta\right)\gamma_h + (k + \eta)\left(q + 2\,\eta\right)\,(\theta + \delta_h)\right)\,(\lambda_h)^*\right)\right)\Big/\\
&\left(d_h^6 + d_h^5\left(k + 2\,q + 4\,\eta + 2\,\theta + 2\,\gamma_h + 2\,\delta_h + (\lambda_h)^*\right) + \right.\\
&\quad d_h^4\left(2\,k\,q + q^2 + 3\,k\,\eta + 6\,q\,\eta + 4\,\eta^2 + 2\,k\,\theta + 4\,q\,\theta + 8\,\eta\,\theta + \gamma_h^2 + \delta_h^2 + k\,(\lambda_h)^* + 2\,q\,(\lambda_h)^* + 3\,\eta\,(\lambda_h)^* + \right.\\
&\qquad \left.2\,\theta\,(\lambda_h)^* + 2\,\delta_h\left(k + 2\,q + 4\,\eta + \theta + (\lambda_h)^*\right) + 2\,\gamma_h\left(k + 2\,q + 4\,\eta + \theta + \delta_h + (\lambda_h)^*\right)\right) + \\
&\quad q\,\delta_h\left(\left(q + 2\,\eta\right)\left(2\,\theta + \delta_h\right)\,(k\,\eta + (k + \eta)\,(\lambda_h)^*) + \eta\,\gamma_h\left(k\left(q + 2\,\eta\right) + \left(2\,k + q + 2\,\eta\right)\,(\lambda_h)^*\right)\right) + \\
&\quad d_h^3\left(k\,q^2 + 4\,k\,q\,\eta + 2\,q^2\,\eta + 2\,k\,\eta^2 + 4\,q\,\eta^2 + 4\,k\,q\,\theta + 2\,q^2\,\theta + 6\,k\,\eta\,\theta + 12\,q\,\eta\,\theta + 8\,\eta^2\,\theta + \right.\\
&\qquad 2\,k\,q\,(\lambda_h)^* + q^2\,(\lambda_h)^* + 2\,k\,\eta\,(\lambda_h)^* + 4\,q\,\eta\,(\lambda_h)^* + 2\,\eta^2\,(\lambda_h)^* + 2\,k\,\theta\,(\lambda_h)^* + \\
&\qquad 4\,q\,\theta\,(\lambda_h)^* + 6\,\eta\,\theta\,(\lambda_h)^* + \gamma_h^2\left(k + 2\,q + 4\,\eta + (\lambda_h)^*\right) + \delta_h^2\left(k + 2\,q + 4\,\eta + (\lambda_h)^*\right) + \\
&\qquad 2\,\delta_h\left(q^2 + 6\,q\,\eta + 4\,\eta^2 + 2\,q\,\theta + 4\,\eta\,\theta + k\left(2\,q + 3\,\eta + \theta\right) + \left(k + 2\,q + 3\,\eta + \theta\right)\,(\lambda_h)^*\right) + \\
&\qquad \gamma_h\left(3\,k\,q + 2\,q^2 + 6\,k\,\eta + 12\,q\,\eta + 8\,\eta^2 + 2\,k\,\theta + 4\,q\,\theta + 8\,\eta\,\theta + \right.\\
&\qquad\quad \left.\left(2\,k + 3\,q + 6\,\eta + 2\,\theta\right)\,(\lambda_h)^* + 2\,\delta_h\left(k + 2\,q + 4\,\eta + (\lambda_h)^*\right)\right) + \\
&\quad d_h^2\left(k\,q^2\,\eta + 2\,k\,q\,\eta^2 + 2\,k\,q^2\,\theta + 8\,k\,q\,\eta\,\theta + 4\,q^2\,\eta\,\theta + 4\,k\,\eta^2\,\theta + 8\,q\,\eta^2\,\theta + k\,q^2\,(\lambda_h)^* + \right.\\
&\qquad 2\,k\,q\,\eta\,(\lambda_h)^* + q^2\,\eta\,(\lambda_h)^* + 2\,q\,\eta^2\,(\lambda_h)^* + 4\,k\,q\,\theta\,(\lambda_h)^* + 2\,q^2\,\theta\,(\lambda_h)^* + 4\,k\,\eta\,\theta\,(\lambda_h)^* + \\
&\qquad 8\,q\,\eta\,\theta\,(\lambda_h)^* + 4\,\eta^2\,\theta\,(\lambda_h)^* + \gamma_h^2\left(q^2 + 6\,q\,\eta + 4\,\eta^2 + k\left(q + 3\,\eta\right) + \left(k + q + 3\,\eta\right)\,(\lambda_h)^*\right) + \\
&\qquad \delta_h^2\left(2\,k\,q + q^2 + 3\,k\,\eta + 6\,q\,\eta + 4\,\eta^2 + \left(k + 2\,q + 3\,\eta\right)\,(\lambda_h)^*\right) + \\
&\qquad 2\,\delta_h\left(2\,q^2\,\eta + 4\,q\,\eta^2 + q^2\,\theta + 6\,q\,\eta\,\theta + 4\,\eta^2\,\theta + k\left(q^2 + 4\,q\,\eta + 2\,\eta^2 + 2\,q\,\theta + 3\,\eta\,\theta\right) + \right.\\
&\qquad\quad \left.\left(q^2 + 4\,q\,\eta + 2\,\eta^2 + 2\,q\,\theta + 3\,\eta\,\theta + k\left(2\,q + 2\,\eta + \theta\right)\right)\,(\lambda_h)^*\right) + \\
&\qquad \gamma_h\left(k\,q^2 + 6\,k\,q\,\eta + 4\,q^2\,\eta + 4\,k\,\eta^2 + 8\,q\,\eta^2 + 3\,k\,q\,\theta + 2\,q^2\,\theta + 6\,k\,\eta\,\theta + 12\,q\,\eta\,\theta + \right.\\
&\qquad\quad 8\,\eta^2\,\theta + \left(q^2 + 6\,q\,\eta + 4\,\eta^2 + 3\,q\,\theta + 6\,\eta\,\theta + 2\,k\left(q + 2\,\eta + \theta\right)\right)\,(\lambda_h)^* + \\
&\qquad\quad \left.\delta_h\left(3\,k\,q + 2\,q^2 + 6\,k\,\eta + 12\,q\,\eta + 8\,\eta^2 + \left(2\,k + 3\,q + 6\,\eta\right)\,(\lambda_h)^*\right)\right) + \\
&\quad d_h\left(2\,q\left(q + 2\,\eta\right)\theta\,(k\,\eta + (k + \eta)\,(\lambda_h)^*) + 2\,\eta\,\gamma_h^2\left(k\,(q + \eta) + q\left(q + 2\,\eta\right) + (k + q + \eta)\,(\lambda_h)^*\right) + \right.\\
&\qquad \left.\delta_h^2\left(2\,q\,\eta\left(q + 2\,\eta\right) + k\left(q^2 + 4\,q\,\eta + 2\,\eta^2\right) + \left(q^2 + 4\,q\,\eta + 2\,\eta^2 + 2\,k\,(q + \eta)\right)\,(\lambda_h)^*\right) + \right.
\end{aligned}
$$

$$2\,\delta_h\,\left(2\,q\,\eta\,\left(q+2\,\eta\right)\,\theta+k\,\left(2\,\eta^2\,\theta+q^2\,\left(\eta+\theta\right)+2\,q\,\eta\,\left(\eta+2\,\theta\right)\right)+\left(2\,\eta^2\,\theta+q^2\,\left(\eta+\theta\right)+2\,q\,\eta\,\left(\eta+2\,\theta\right)+k\,\left(q^2+2\,\eta\,\theta+2\,q\,\left(\eta+\theta\right)\right)\right)\,\left(\lambda_h\right)^*\right)+\gamma_h\,\left(\left(q+2\,\eta\right)\,\left(2\,k\,\eta\,\theta+4\,q\,\eta\,\theta+k\,q\,\left(\eta+\theta\right)\right)+\left(2\,k+q+2\,\eta\right)\,\left(2\,\eta\,\theta+q\,\left(\eta+\theta\right)\right)\,\left(\lambda_h\right)^*+\delta_h\,\left(4\,q\,\eta\,\left(q+2\,\eta\right)+k\,\left(q^2+6\,q\,\eta+4\,\eta^2\right)+\left(q^2+6\,q\,\eta+4\,\eta^2+2\,k\,\left(q+2\,\eta\right)\right)\,\left(\lambda_h\right)^*\right)\right)\right)$$

$$z^*=\left(\Lambda\,\gamma_h\,\left(k\,q\,\eta\,\theta+2\,k\,\eta^2\,\theta+k\,\eta^2\,\delta_h+k\,q\,\theta\,\left(\lambda_h\right)^*+2\,k\,\eta\,\theta\,\left(\lambda_h\right)^*+q\,\eta\,\theta\,\left(\lambda_h\right)^*+2\,\eta^2\,\theta\,\left(\lambda_h\right)^*+d_h^3\,\left(\lambda_h\right)^*+k\,q\,\delta_h\,\left(\lambda_h\right)^*+k\,\eta\,\delta_h\,\left(\lambda_h\right)^*+q\,\eta\,\delta_h\,\left(\lambda_h\right)^*+\eta^2\,\delta_h\,\left(\lambda_h\right)^*+d_h^2\,\left(k+q+2\,\eta+\theta+\gamma_h+\delta_h\right)\,\left(\lambda_h\right)^*+\eta\,\gamma_h\,\left(k\,\eta+\left(k+q+\eta\right)\,\left(\lambda_h\right)^*\right)+d_h\,\left(k\,\eta\,\left(\eta+\theta\right)+\left(k\,q+k\,\eta+q\,\eta+\eta^2+k\,\theta+q\,\theta+3\,\eta\,\theta+\left(k+q+2\,\eta\right)\,\gamma_h+\left(k+q+2\,\eta\right)\,\delta_h\right)\,\left(\lambda_h\right)^*\right)\right)\Big/\left(d_h^6+d_h^5\,\left(k+2\,q+4\,\eta+2\,\theta+2\,\gamma_h+2\,\delta_h+\left(\lambda_h\right)^*\right)+d_h^4\,\left(2\,k\,q+q^2+3\,k\,\eta+6\,q\,\eta+4\,\eta^2+2\,k\,\theta+4\,q\,\theta+8\,\eta\,\theta+\gamma_h^2+\delta_h^2+k\,\left(\lambda_h\right)^*+2\,q\,\left(\lambda_h\right)^*+3\,\eta\,\left(\lambda_h\right)^*+2\,\theta\,\left(\lambda_h\right)^*+2\,\delta_h\,\left(k+2\,q+4\,\eta+\theta+\left(\lambda_h\right)^*\right)+2\,\gamma_h\,\left(k+2\,q+4\,\eta+\theta+\delta_h+\left(\lambda_h\right)^*\right)\right)+q\,\delta_h\,\left(\left(q+2\,\eta\right)\,\left(2\,\theta+\delta_h\right)\,\left(k\,\eta+\left(k+\eta\right)\,\left(\lambda_h\right)^*\right)+\eta\,\gamma_h\,\left(k\,\left(q+2\,\eta\right)+\left(2\,k+q+2\,\eta\right)\,\left(\lambda_h\right)^*\right)\right)+d_h^3\,\left(k\,q^2+4\,k\,q\,\eta+2\,q^2\,\eta+2\,k\,\eta^2+4\,q\,\eta^2+4\,k\,q\,\theta+2\,q^2\,\theta+6\,k\,\eta\,\theta+12\,q\,\eta\,\theta+8\,\eta^2\,\theta+2\,k\,q\,\left(\lambda_h\right)^*+q^2\,\left(\lambda_h\right)^*+2\,k\,\eta\,\left(\lambda_h\right)^*+4\,q\,\eta\,\left(\lambda_h\right)^*+2\,\eta^2\,\left(\lambda_h\right)^*+2\,k\,\theta\,\left(\lambda_h\right)^*+4\,q\,\theta\,\left(\lambda_h\right)^*+6\,\eta\,\theta\,\left(\lambda_h\right)^*+\gamma_h^2\,\left(k+2\,q+4\,\eta+\left(\lambda_h\right)^*\right)+\delta_h^2\,\left(k+2\,q+4\,\eta+\left(\lambda_h\right)^*\right)+2\,\delta_h\,\left(q^2+6\,q\,\eta+4\,\eta^2+2\,q\,\theta+4\,\eta\,\theta+k\,\left(2\,q+3\,\eta+\theta\right)+\left(k+2\,q+3\,\eta+\theta\right)\,\left(\lambda_h\right)^*\right)+\gamma_h\,\left(3\,k\,q+2\,q^2+6\,k\,\eta+12\,q\,\eta+8\,\eta^2+2\,k\,\theta+4\,q\,\theta+8\,\eta\,\theta+\left(2\,k+3\,q+6\,\eta+2\,\theta\right)\,\left(\lambda_h\right)^*+2\,\delta_h\,\left(k+2\,q+4\,\eta+\left(\lambda_h\right)^*\right)\right)\right)+d_h^2\,\left(k\,q^2\,\eta+2\,k\,q\,\eta^2+2\,k\,q^2\,\theta+8\,k\,q\,\eta\,\theta+4\,q^2\,\eta\,\theta+4\,k\,\eta^2\,\theta+8\,q\,\eta^2\,\theta+k\,q^2\,\left(\lambda_h\right)^*+2\,k\,q\,\eta\,\left(\lambda_h\right)^*+q^2\,\eta\,\left(\lambda_h\right)^*+2\,q\,\eta^2\,\left(\lambda_h\right)^*+4\,k\,q\,\theta\,\left(\lambda_h\right)^*+2\,q^2\,\theta\,\left(\lambda_h\right)^*+4\,k\,\eta\,\theta\,\left(\lambda_h\right)^*+8\,q\,\eta\,\theta\,\left(\lambda_h\right)^*+4\,\eta^2\,\theta\,\left(\lambda_h\right)^*+\gamma_h^2\,\left(q^2+6\,q\,\eta+4\,\eta^2+k\,\left(q+3\,\eta\right)+\left(k+q+3\,\eta\right)\,\left(\lambda_h\right)^*\right)+\delta_h^2\,\left(2\,k\,q+q^2+3\,k\,\eta+6\,q\,\eta+4\,\eta^2+\left(k+2\,q+3\,\eta\right)\,\left(\lambda_h\right)^*\right)+2\,\delta_h\,\left(2\,q^2\,\eta+4\,q\,\eta^2+q^2\,\theta+6\,q\,\eta\,\theta+4\,\eta^2\,\theta+k\,\left(q^2+4\,q\,\eta+2\,\eta^2+2\,q\,\theta+3\,\eta\,\theta\right)+\left(q^2+4\,q\,\eta+2\,\eta^2+2\,q\,\theta+3\,\eta\,\theta+k\,\left(2\,q+2\,\eta+\theta\right)\right)\,\left(\lambda_h\right)^*\right)+\gamma_h\,\left(k\,q^2+6\,k\,q\,\eta+4\,q^2\,\eta+4\,k\,\eta^2+8\,q\,\eta^2+3\,k\,q\,\theta+2\,q^2\,\theta+6\,k\,\eta\,\theta+12\,q\,\eta\,\theta+8\,\eta^2\,\theta+\left(q^2+6\,q\,\eta+4\,\eta^2+3\,q\,\theta+6\,\eta\,\theta+2\,k\,\left(q+2\,\eta+\theta\right)\right)\,\left(\lambda_h\right)^*+\delta_h\,\left(3\,k\,q+2\,q^2+6\,k\,\eta+12\,q\,\eta+8\,\eta^2+\left(2\,k+3\,q+6\,\eta\right)\,\left(\lambda_h\right)^*\right)\right)\right)+d_h\,\left(2\,q\,\left(q+2\,\eta\right)\,\theta\,\left(k\,\eta+\left(k+\eta\right)\,\left(\lambda_h\right)^*\right)+2\,\eta\,\gamma_h^2\,\left(k\,\left(q+\eta\right)+q\,\left(q+2\,\eta\right)+\left(k+q+\eta\right)\,\left(\lambda_h\right)^*\right)+\delta_h^2\,\left(2\,q\,\eta\,\left(q+2\,\eta\right)+k\,\left(q^2+4\,q\,\eta+2\,\eta^2\right)+\left(q^2+4\,q\,\eta+2\,\eta^2+2\,k\,\left(q+\eta\right)\right)\,\left(\lambda_h\right)^*\right)+2\,\delta_h\,\left(2\,q\,\eta\,\left(q+2\,\eta\right)\,\theta+k\,\left(2\,\eta^2\,\theta+q^2\,\left(\eta+\theta\right)+2\,q\,\eta\,\left(\eta+2\,\theta\right)\right)+\left(2\,\eta^2\,\theta+q^2\,\left(\eta+\theta\right)+2\,q\,\eta\,\left(\eta+2\,\theta\right)+k\,\left(q^2+2\,\eta\,\theta+2\,q\,\left(\eta+\theta\right)\right)\right)\,\left(\lambda_h\right)^*\right)+\gamma_h\,\left(\left(q+2\,\eta\right)\,\left(2\,k\,\eta\,\theta+4\,q\,\eta\,\theta+k\,q\,\left(\eta+\theta\right)\right)+\left(2\,k+q+2\,\eta\right)\,\left(2\,\eta\,\theta+q\,\left(\eta+\theta\right)\right)\,\left(\lambda_h\right)^*+\delta_h\,\left(4\,q\,\eta\,\left(q+2\,\eta\right)+k\,\left(q^2+6\,q\,\eta+4\,\eta^2\right)+\left(q^2+6\,q\,\eta+4\,\eta^2+2\,k\,\left(q+2\,\eta\right)\right)\,\left(\lambda_h\right)^*\right)\right)\right)$$

$$X^*=\left(\Lambda\,\left(\eta\,d_h^4+2\,\eta\,d_h^3\,\left(q+\eta+\theta+\gamma_h+\delta_h\right)+\eta\,d_h^2\,\left(q^2+2\,q\,\eta+4\,q\,\theta+4\,\eta\,\theta+\gamma_h^2+2\,\left(2\,q+2\,\eta+\theta\right)\,\delta_h+\delta_h^2+2\,\gamma_h\,\left(2\,q+2\,\eta+\theta+\delta_h\right)\right)+d_h\,\left(2\,\eta\,\left(q+\eta\right)\,\gamma_h^2+2\,\eta\,\left(q\,\left(q+2\,\eta\right)\,\theta+\left(q^2+2\,\eta\,\theta+2\,q\,\left(\eta+\theta\right)\right)\,\delta_h+\left(q+\eta\right)\,\delta_h^2\right)+\gamma_h\,\left(2\,\eta\,\left(q^2+2\,\eta\,\theta+2\,q\,\left(\eta+\theta\right)\right)+4\,\eta\,\left(q+\eta\right)\,\delta_h+q\,\left(\theta+\left(\lambda_h\right)^*\right)\right)+q\,\left(\eta\,\left(q+2\,\eta\right)\,\delta_h\,\left(2\,\theta+\delta_h\right)+\eta\,\gamma_h^2\,\left(q+2\,\eta+\left(\lambda_h\right)^*\right)+\gamma_h\,\left(\left(q+2\,\eta\right)\,\theta\,\left(2\,\eta+\left(\lambda_h\right)^*\right)+\eta\,\delta_h\,\left(2\,q+4\,\eta+\left(\lambda_h\right)^*\right)\right)\right)\right)\Big/\left(d_h^6+d_h^5\,\left(k+2\,q+4\,\eta+2\,\theta+2\,\gamma_h+2\,\delta_h+\left(\lambda_h\right)^*\right)+d_h^4\,\left(2\,k\,q+q^2+3\,k\,\eta+6\,q\,\eta+4\,\eta^2+2\,k\,\theta+4\,q\,\theta+8\,\eta\,\theta+\gamma_h^2+\delta_h^2+k\,\left(\lambda_h\right)^*+2\,q\,\left(\lambda_h\right)^*+3\,\eta\,\left(\lambda_h\right)^*+2\,\theta\,\left(\lambda_h\right)^*+2\,\delta_h\,\left(k+2\,q+4\,\eta+\theta+\left(\lambda_h\right)^*\right)+2\,\gamma_h\,\left(k+2\,q+4\,\eta+\theta+\delta_h+\left(\lambda_h\right)^*\right)\right)+q\,\delta_h\,\left(\left(q+2\,\eta\right)\,\left(2\,\theta+\delta_h\right)\,\left(k\,\eta+\left(k+\eta\right)\,\left(\lambda_h\right)^*\right)+\eta\,\gamma_h\,\left(k\,\left(q+2\,\eta\right)+\left(2\,k+q+2\,\eta\right)\,\left(\lambda_h\right)^*\right)+$$

$$
\begin{aligned}
&d_h^3 \left(k q^2 + 4 k q \eta + 2 q^2 \eta + 2 k \eta^2 + 4 q \eta^2 + 4 k q \theta + 2 q^2 \theta + 6 k \eta \theta + 12 q \eta \theta + 8 \eta^2 \theta + \right. \\
&\quad 2 k q (\lambda_h)^* + q^2 (\lambda_h)^* + 2 k \eta (\lambda_h)^* + 4 q \eta (\lambda_h)^* + 2 \eta^2 (\lambda_h)^* + 2 k \theta (\lambda_h)^* + \\
&\quad 4 q \theta (\lambda_h)^* + 6 \eta \theta (\lambda_h)^* + \gamma_h^2 \left(k + 2 q + 4 \eta + (\lambda_h)^*\right) + \delta_h^2 \left(k + 2 q + 4 \eta + (\lambda_h)^*\right) + \\
&\quad 2 \delta_h \left(q^2 + 6 q \eta + 4 \eta^2 + 2 q \theta + 4 \eta \theta + k \left(2 q + 3 \eta + \theta\right) + \left(k + 2 q + 3 \eta + \theta\right) (\lambda_h)^*\right) + \\
&\quad \gamma_h \left(3 k q + 2 q^2 + 6 k \eta + 12 q \eta + 8 \eta^2 + 2 k \theta + 4 q \theta + 8 \eta \theta + \right. \\
&\qquad \left.\left.\left(2 k + 3 q + 6 \eta + 2 \theta\right) (\lambda_h)^* + 2 \delta_h \left(k + 2 q + 4 \eta + (\lambda_h)^*\right)\right)\right) + \\
&d_h^2 \left(k q^2 \eta + 2 k q \eta^2 + 2 k q^2 \theta + 8 k q \eta \theta + 4 q^2 \eta \theta + 4 k \eta^2 \theta + 8 q \eta^2 \theta + k q^2 (\lambda_h)^* + \right. \\
&\quad 2 k q \eta (\lambda_h)^* + q^2 \eta (\lambda_h)^* + 2 q \eta^2 (\lambda_h)^* + 4 k q \theta (\lambda_h)^* + 2 q^2 \theta (\lambda_h)^* + 4 k \eta \theta (\lambda_h)^* + \\
&\quad 8 q \eta \theta (\lambda_h)^* + 4 \eta^2 \theta (\lambda_h)^* + \gamma_h^2 \left(q^2 + 6 q \eta + 4 \eta^2 + k \left(q + 3 \eta\right) + \left(k + q + 3 \eta\right) (\lambda_h)^*\right) + \\
&\quad \delta_h^2 \left(2 k q + q^2 + 3 k \eta + 6 q \eta + 4 \eta^2 + \left(k + 2 q + 3 \eta\right) (\lambda_h)^*\right) + \\
&\quad 2 \delta_h \left(2 q^2 \eta + 4 q \eta^2 + q^2 \theta + 6 q \eta \theta + 4 \eta^2 \theta + k \left(q^2 + 4 q \eta + 2 \eta^2 + 2 q \theta + 3 \eta \theta\right) + \right. \\
&\qquad \left.\left(q^2 + 4 q \eta + 2 \eta^2 + 2 q \theta + 3 \eta \theta + k \left(2 q + 2 \eta + \theta\right)\right) (\lambda_h)^*\right) + \\
&\quad \gamma_h \left(k q^2 + 6 k q \eta + 4 q^2 \eta + 4 k \eta^2 + 8 q \eta^2 + 3 k q \theta + 2 q^2 \theta + 6 k \eta \theta + 12 q \eta \theta + \right. \\
&\qquad 8 \eta^2 \theta + \left(q^2 + 6 q \eta + 4 \eta^2 + 3 q \theta + 6 \eta \theta + 2 k \left(q + 2 \eta + \theta\right)\right) (\lambda_h)^* + \\
&\qquad \left.\left.\delta_h \left(3 k q + 2 q^2 + 6 k \eta + 12 q \eta + 8 \eta^2 + \left(2 k + 3 q + 6 \eta\right) (\lambda_h)^*\right)\right)\right) + \\
&d_h \left(2 q \left(q + 2 \eta\right) \theta \left(k \eta + (k + \eta) (\lambda_h)^*\right) + 2 \eta \gamma_h^2 \left(k (q + \eta) + q \left(q + 2 \eta\right) + (k + q + \eta) (\lambda_h)^*\right) + \right. \\
&\quad \delta_h^2 \left(2 q \eta \left(q + 2 \eta\right) + k \left(q^2 + 4 q \eta + 2 \eta^2\right) + \left(q^2 + 4 q \eta + 2 \eta^2 + 2 k (q + \eta)\right) (\lambda_h)^*\right) + \\
&\quad 2 \delta_h \left(2 q \eta \left(q + 2 \eta\right) \theta + k \left(2 \eta^2 \theta + q^2 (\eta + \theta) + 2 q \eta \left(\eta + 2 \theta\right)\right) + \right. \\
&\qquad \left.\left(2 \eta^2 \theta + q^2 (\eta + \theta) + 2 q \eta \left(\eta + 2 \theta\right) + k \left(q^2 + 2 \eta \theta + 2 q (\eta + \theta)\right)\right) (\lambda_h)^*\right) + \\
&\quad \gamma_h \left(\left(q + 2 \eta\right) \left(2 k \eta \theta + 4 q \eta \theta + k q (\eta + \theta)\right) + \left(2 k + q + 2 \eta\right) \left(2 \eta \theta + q (\eta + \theta)\right) (\lambda_h)^* + \right. \\
&\qquad \left.\left.\delta_h \left(4 q \eta \left(q + 2 \eta\right) + k \left(q^2 + 6 q \eta + 4 \eta^2\right) + \left(q^2 + 6 q \eta + 4 \eta^2 + 2 k \left(q + 2 \eta\right)\right) (\lambda_h)^*\right)\right)\right)\right) \\
&Y^* = \left(\Lambda \left(d_h^3 (k \eta + \theta (\lambda_h)^*) + d_h^2 \left(2 k q \eta + 2 k \eta^2 + k \eta \theta + k \eta \gamma_h + k \eta \delta_h + k \theta (\lambda_h)^* + \right. \right. \right. \\
&\qquad \left. 2 q \theta (\lambda_h)^* + 3 \eta \theta (\lambda_h)^*\right) + d_h \left(k q^2 \eta + 2 k q \eta^2 + 2 k q \eta \theta + 2 k \eta^2 \theta + 2 k \eta (q + \eta) \gamma_h + \right. \\
&\qquad \left. 2 k \eta (q + \eta) \delta_h + 2 k q \theta (\lambda_h)^* + q^2 \theta (\lambda_h)^* + 2 k \eta \theta (\lambda_h)^* + 4 q \eta \theta (\lambda_h)^* + 2 \eta^2 \theta (\lambda_h)^*\right) + \\
&\quad \left. q \left(k \eta \gamma_h \left(q + 2 \eta + (\lambda_h)^*\right) + \left(q + 2 \eta\right) (k \eta \theta + k \eta \delta_h + (k + \eta) \theta (\lambda_h)^*)\right)\right)\right) / \\
&\quad \left(d_h^6 + d_h^5 \left(k + 2 q + 4 \eta + 2 \theta + 2 \gamma_h + 2 \delta_h + (\lambda_h)^*\right) + \right. \\
&\qquad d_h^4 \left(2 k q + q^2 + 3 k \eta + 6 q \eta + 4 \eta^2 + 2 k \theta + 4 q \theta + 8 \eta \theta + \gamma_h^2 + \delta_h^2 + k (\lambda_h)^* + 2 q (\lambda_h)^* + 3 \eta (\lambda_h)^* + \right. \\
&\qquad \left. 2 \theta (\lambda_h)^* + 2 \delta_h \left(k + 2 q + 4 \eta + \theta + (\lambda_h)^*\right) + 2 \gamma_h \left(k + 2 q + 4 \eta + \theta + \delta_h + (\lambda_h)^*\right)\right) + \\
&\qquad q \delta_h \left(\left(q + 2 \eta\right) \left(2 \theta + \delta_h\right) (k \eta + (k + \eta) (\lambda_h)^*) + \eta \gamma_h \left(k \left(q + 2 \eta\right) + \left(2 k + q + 2 \eta\right) (\lambda_h)^*\right)\right) + \\
&\qquad d_h^3 \left(k q^2 + 4 k q \eta + 2 q^2 \eta + 2 k \eta^2 + 4 q \eta^2 + 4 k q \theta + 2 q^2 \theta + 6 k \eta \theta + 12 q \eta \theta + 8 \eta^2 \theta + \right. \\
&\qquad\quad 2 k q (\lambda_h)^* + q^2 (\lambda_h)^* + 2 k \eta (\lambda_h)^* + 4 q \eta (\lambda_h)^* + 2 \eta^2 (\lambda_h)^* + 2 k \theta (\lambda_h)^* + \\
&\qquad\quad 4 q \theta (\lambda_h)^* + 6 \eta \theta (\lambda_h)^* + \gamma_h^2 \left(k + 2 q + 4 \eta + (\lambda_h)^*\right) + \delta_h^2 \left(k + 2 q + 4 \eta + (\lambda_h)^*\right) + \\
&\qquad\quad 2 \delta_h \left(q^2 + 6 q \eta + 4 \eta^2 + 2 q \theta + 4 \eta \theta + k \left(2 q + 3 \eta + \theta\right) + \left(k + 2 q + 3 \eta + \theta\right) (\lambda_h)^*\right) + \\
&\qquad\quad \gamma_h \left(3 k q + 2 q^2 + 6 k \eta + 12 q \eta + 8 \eta^2 + 2 k \theta + 4 q \theta + 8 \eta \theta + \right. \\
&\qquad\qquad \left.\left(2 k + 3 q + 6 \eta + 2 \theta\right) (\lambda_h)^* + 2 \delta_h \left(k + 2 q + 4 \eta + (\lambda_h)^*\right)\right)\right) + \\
&\qquad d_h^2 \left(k q^2 \eta + 2 k q \eta^2 + 2 k q^2 \theta + 8 k q \eta \theta + 4 q^2 \eta \theta + 4 k \eta^2 \theta + 8 q \eta^2 \theta + k q^2 (\lambda_h)^* + \right. \\
&\qquad\quad 2 k q \eta (\lambda_h)^* + q^2 \eta (\lambda_h)^* + 2 q \eta^2 (\lambda_h)^* + 4 k q \theta (\lambda_h)^* + 2 q^2 \theta (\lambda_h)^* + 4 k \eta \theta (\lambda_h)^* + \\
&\qquad\quad 8 q \eta \theta (\lambda_h)^* + 4 \eta^2 \theta (\lambda_h)^* + \gamma_h^2 \left(q^2 + 6 q \eta + 4 \eta^2 + k \left(q + 3 \eta\right) + \left(k + q + 3 \eta\right) (\lambda_h)^*\right) + \\
&\qquad\quad \delta_h^2 \left(2 k q + q^2 + 3 k \eta + 6 q \eta + 4 \eta^2 + \left(k + 2 q + 3 \eta\right) (\lambda_h)^*\right) + \\
&\qquad\quad 2 \delta_h \left(2 q^2 \eta + 4 q \eta^2 + q^2 \theta + 6 q \eta \theta + 4 \eta^2 \theta + k \left(q^2 + 4 q \eta + 2 \eta^2 + 2 q \theta + 3 \eta \theta\right) + \right. \\
&\qquad\qquad \left.\left(q^2 + 4 q \eta + 2 \eta^2 + 2 q \theta + 3 \eta \theta + k \left(2 q + 2 \eta + \theta\right)\right) (\lambda_h)^*\right) + \\
&\qquad\quad \gamma_h \left(k q^2 + 6 k q \eta + 4 q^2 \eta + 4 k \eta^2 + 8 q \eta^2 + 3 k q \theta + 2 q^2 \theta + 6 k \eta \theta + 12 q \eta \theta + \right. \\
&\qquad\qquad 8 \eta^2 \theta + \left(q^2 + 6 q \eta + 4 \eta^2 + 3 q \theta + 6 \eta \theta + 2 k \left(q + 2 \eta + \theta\right)\right) (\lambda_h)^* +
\end{aligned}
$$

$$\delta_h \left(3\,k\,q + 2\,q^2 + 6\,k\,\eta + 12\,q\,\eta + 8\,\eta^2 + \left(2\,k + 3\,q + 6\,\eta\right)\,(\lambda_h)^*\right)\Big) +$$
$$d_h \Big(2\,q\,\left(q + 2\,\eta\right)\,\theta\,\left(k\,\eta + (k+\eta)\,(\lambda_h)^*\right) + 2\,\eta\,\gamma_h^2\,\left(k\,(q+\eta) + q\,\left(q + 2\,\eta\right) + (k+q+\eta)\,(\lambda_h)^*\right) +$$
$$\delta_h^2\,\left(2\,q\,\eta\,\left(q + 2\,\eta\right) + k\,\left(q^2 + 4\,q\,\eta + 2\,\eta^2\right) + \left(q^2 + 4\,q\,\eta + 2\,\eta^2 + 2\,k\,(q+\eta)\right)\,(\lambda_h)^*\right) +$$
$$2\,\delta_h\,\left(2\,q\,\eta\,\left(q + 2\,\eta\right)\,\theta + k\,\left(2\,\eta^2\,\theta + q^2\,(\eta+\theta) + 2\,q\,\eta\,\left(\eta + 2\,\theta\right)\right) +$$
$$\left(2\,\eta^2\,\theta + q^2\,(\eta+\theta) + 2\,q\,\eta\,\left(\eta + 2\,\theta\right) + k\,\left(q^2 + 2\,\eta\,\theta + 2\,q\,(\eta+\theta)\right)\right)\,(\lambda_h)^*\right) +$$
$$\gamma_h\,\left(\left(q + 2\,\eta\right)\,\left(2\,k\,\eta\,\theta + 4\,q\,\eta\,\theta + k\,q\,(\eta+\theta)\right) + \left(2\,k + q + 2\,\eta\right)\,\left(2\,\eta\,\theta + q\,(\eta+\theta)\right)\,(\lambda_h)^* +$$
$$\delta_h\,\left(4\,q\,\eta\,\left(q + 2\,\eta\right) + k\,\left(q^2 + 6\,q\,\eta + 4\,\eta^2\right) + \left(q^2 + 6\,q\,\eta + 4\,\eta^2 + 2\,k\,\left(q + 2\,\eta\right)\right)\,(\lambda_h)^*\right)\Big)\Big)\Big)$$

$$Z^* = \Big(\Lambda\,\gamma_h\,\Big(k\,q\,\eta\,\theta + 2\,k\,\eta^2\,\theta + k\,q\,\eta\,\delta_h + k\,\eta^2\,\delta_h + k\,q\,\theta\,(\lambda_h)^* + 2\,k\,\eta\,\theta\,(\lambda_h)^* + q\,\eta\,\theta\,(\lambda_h)^* +$$
$$2\,\eta^2\,\theta\,(\lambda_h)^* + k\,\eta\,\delta_h\,(\lambda_h)^* + \eta^2\,\delta_h\,(\lambda_h)^* + \eta\,\gamma_h\,(k\,(q+\eta) + (k+\eta)\,(\lambda_h)^*) +$$
$$d_h^2\,(k\,\eta + (\eta+\theta)\,(\lambda_h)^*) + d_h\,\Big(k\,q\,\eta + k\,\eta^2 + k\,\eta\,\theta + k\,\eta\,(\lambda_h)^* + \eta^2\,(\lambda_h)^* +$$
$$k\,\theta\,(\lambda_h)^* + q\,\theta\,(\lambda_h)^* + 3\,\eta\,\theta\,(\lambda_h)^* + \eta\,\gamma_h\,(k + (\lambda_h)^*) + \eta\,\delta_h\,(k + (\lambda_h)^*)\Big)\Big)\Big) \Big/$$
$$\Big(d_h^6 + d_h^5\,\left(k + 2\,q + 4\,\eta + 2\,\theta + 2\,\gamma_h + 2\,\delta_h + (\lambda_h)^*\right) + d_h^4\,\left(2\,k\,q + q^2 + 3\,k\,\eta + 6\,q\,\eta + 4\,\eta^2 +$$
$$2\,k\,\theta + 4\,q\,\theta + 8\,\eta\,\theta + \gamma_h^2 + \delta_h^2 + k\,(\lambda_h)^* + 2\,q\,(\lambda_h)^* + 3\,\eta\,(\lambda_h)^* + 2\,\theta\,(\lambda_h)^* +$$
$$2\,\delta_h\,\left(k + 2\,q + 4\,\eta + \theta + (\lambda_h)^*\right) + 2\,\gamma_h\,\left(k + 2\,q + 4\,\eta + \theta + \delta_h + (\lambda_h)^*\right)\Big) +$$
$$q\,\delta_h\,\Big(\left(q + 2\,\eta\right)\,\left(2\,\theta + \delta_h\right)\,\left(k\,\eta + (k+\eta)\,(\lambda_h)^*\right) + \eta\,\gamma_h\,\left(k\,\left(q + 2\,\eta\right) + \left(2\,k + q + 2\,\eta\right)\,(\lambda_h)^*\right)\Big) +$$
$$d_h^3\,\Big(k\,q^2 + 4\,k\,q\,\eta + 2\,q^2\,\eta + 2\,k\,\eta^2 + 4\,q\,\eta^2 + 4\,k\,q\,\theta + 2\,q^2\,\theta + 6\,k\,\eta\,\theta + 12\,q\,\eta\,\theta + 8\,\eta^2\,\theta +$$
$$2\,k\,q\,(\lambda_h)^* + q^2\,(\lambda_h)^* + 2\,k\,\eta\,(\lambda_h)^* + 4\,q\,\eta\,(\lambda_h)^* + 2\,\eta^2\,(\lambda_h)^* + 2\,k\,\theta\,(\lambda_h)^* +$$
$$4\,q\,\theta\,(\lambda_h)^* + 6\,\eta\,\theta\,(\lambda_h)^* + \gamma_h^2\,\left(k + 2\,q + 4\,\eta + (\lambda_h)^*\right) + \delta_h^2\,\left(k + 2\,q + 4\,\eta + (\lambda_h)^*\right) +$$
$$2\,\delta_h\,\left(q^2 + 6\,q\,\eta + 4\,\eta^2 + 2\,q\,\theta + 4\,\eta\,\theta + k\,\left(2\,q + 3\,\eta + \theta\right) + \left(k + 2\,q + 3\,\eta + \theta\right)\,(\lambda_h)^*\right) +$$
$$\gamma_h\,\Big(3\,k\,q + 2\,q^2 + 6\,k\,\eta + 12\,q\,\eta + 8\,\eta^2 + 2\,k\,\theta + 4\,q\,\theta + 8\,\eta\,\theta +$$
$$\left(2\,k + 3\,q + 6\,\eta + 2\,\theta\right)\,(\lambda_h)^* + 2\,\delta_h\,\left(k + 2\,q + 4\,\eta + (\lambda_h)^*\right)\Big) +$$
$$d_h^2\,\Big(k\,q^2\,\eta + 2\,k\,q\,\eta^2 + 2\,k\,q^2\,\theta + 8\,k\,q\,\eta\,\theta + 4\,q^2\,\eta\,\theta + 4\,k\,\eta^2\,\theta + 8\,q\,\eta^2\,\theta + k\,q^2\,(\lambda_h)^* +$$
$$2\,k\,q\,\eta\,(\lambda_h)^* + q^2\,\eta\,(\lambda_h)^* + 2\,q\,\eta^2\,(\lambda_h)^* + 4\,k\,q\,\theta\,(\lambda_h)^* + 2\,q^2\,\theta\,(\lambda_h)^* + 4\,k\,\eta\,\theta\,(\lambda_h)^* +$$
$$8\,q\,\eta\,\theta\,(\lambda_h)^* + 4\,\eta^2\,\theta\,(\lambda_h)^* + \gamma_h^2\,\left(q^2 + 6\,q\,\eta + 4\,\eta^2 + k\,\left(q + 3\,\eta\right) + \left(k + q + 3\,\eta\right)\,(\lambda_h)^*\right) +$$
$$\delta_h^2\,\left(2\,k\,q + q^2 + 3\,k\,\eta + 6\,q\,\eta + 4\,\eta^2 + \left(k + 2\,q + 3\,\eta\right)\,(\lambda_h)^*\right) +$$
$$2\,\delta_h\,\left(2\,q^2\,\eta + 4\,q\,\eta^2 + q^2\,\theta + 6\,q\,\eta\,\theta + 4\,\eta^2\,\theta + k\,\left(q^2 + 4\,q\,\eta + 2\,\eta^2 + 2\,q\,\theta + 3\,\eta\,\theta\right) +$$
$$\left(q^2 + 4\,q\,\eta + 2\,\eta^2 + 2\,q\,\theta + 3\,\eta\,\theta + k\,\left(2\,q + 2\,\eta + \theta\right)\right)\,(\lambda_h)^*\right) +$$
$$\gamma_h\,\Big(k\,q^2 + 6\,k\,q\,\eta + 4\,q^2\,\eta + 4\,k\,\eta^2 + 8\,q\,\eta^2 + 3\,k\,q\,\theta + 2\,q^2\,\theta + 6\,k\,\eta\,\theta + 12\,q\,\eta\,\theta +$$
$$8\,\eta^2\,\theta + \left(q^2 + 6\,q\,\eta + 4\,\eta^2 + 3\,q\,\theta + 6\,\eta\,\theta + 2\,k\,\left(q + 2\,\eta + \theta\right)\right)\,(\lambda_h)^* +$$
$$\delta_h\,\left(3\,k\,q + 2\,q^2 + 6\,k\,\eta + 12\,q\,\eta + 8\,\eta^2 + \left(2\,k + 3\,q + 6\,\eta\right)\,(\lambda_h)^*\right)\Big)\Big) +$$
$$d_h\,\Big(2\,q\,\left(q + 2\,\eta\right)\,\theta\,\left(k\,\eta + (k+\eta)\,(\lambda_h)^*\right) + 2\,\eta\,\gamma_h^2\,\left(k\,(q+\eta) + q\,\left(q + 2\,\eta\right) + (k+q+\eta)\,(\lambda_h)^*\right) +$$
$$\delta_h^2\,\left(2\,q\,\eta\,\left(q + 2\,\eta\right) + k\,\left(q^2 + 4\,q\,\eta + 2\,\eta^2\right) + \left(q^2 + 4\,q\,\eta + 2\,\eta^2 + 2\,k\,(q+\eta)\right)\,(\lambda_h)^*\right) +$$
$$2\,\delta_h\,\left(2\,q\,\eta\,\left(q + 2\,\eta\right)\,\theta + k\,\left(2\,\eta^2\,\theta + q^2\,(\eta+\theta) + 2\,q\,\eta\,\left(\eta + 2\,\theta\right)\right) +$$
$$\left(2\,\eta^2\,\theta + q^2\,(\eta+\theta) + 2\,q\,\eta\,\left(\eta + 2\,\theta\right) + k\,\left(q^2 + 2\,\eta\,\theta + 2\,q\,(\eta+\theta)\right)\right)\,(\lambda_h)^*\right) +$$
$$\gamma_h\,\left(\left(q + 2\,\eta\right)\,\left(2\,k\,\eta\,\theta + 4\,q\,\eta\,\theta + k\,q\,(\eta+\theta)\right) + \left(2\,k + q + 2\,\eta\right)\,\left(2\,\eta\,\theta + q\,(\eta+\theta)\right)\,(\lambda_h)^* +$$
$$\delta_h\,\left(4\,q\,\eta\,\left(q + 2\,\eta\right) + k\,\left(q^2 + 6\,q\,\eta + 4\,\eta^2\right) + \left(q^2 + 6\,q\,\eta + 4\,\eta^2 + 2\,k\,\left(q + 2\,\eta\right)\right)\,(\lambda_h)^*\right)\Big)\Big)\Big)$$

Out[12]=
$$\Big(\Lambda\,\Big(d_h^5+d_h^4\,(k+2\,q+3\,\eta+2\,\theta+2\,\gamma_h+2\,\delta_h)+d_h^3\,\Big(2\,k\,q+q^2+2\,k\,\eta+4\,q\,\eta+2\,\eta^2+2\,k\,\theta+4\,q\,\theta+6\,\eta\,\theta+\gamma_h^2+2\,(k+2\,q+3\,\eta+\theta)\,\delta_h+\delta_h^2+2\,\gamma_h\,(k+2\,q+3\,\eta+\theta+\delta_h)\Big)+d_h^2\,\Big(k\,q^2+2\,k\,q\,\eta+q^2\,\eta+2\,q\,\eta^2+4\,k\,q\,\theta+2\,q^2\,\theta+4\,k\,\eta\,\theta+8\,q\,\eta\,\theta+4\,\eta^2\,\theta+(k+2\,q+3\,\eta)\,\gamma_h^2+2\,\Big(q^2+4\,q\,\eta+2\,\eta^2+2\,q\,\theta+3\,\eta\,\theta+k\,(2\,q+2\,\eta+\theta)\Big)\,\delta_h+(k+2\,q+3\,\eta)\,\delta_h^2+\gamma_h\,\Big(3\,k\,q+2\,q^2+4\,k\,\eta+8\,q\,\eta+4\,\eta^2+2\,k\,\theta+4\,q\,\theta+6\,\eta\,\theta+2\,(k+2\,q+3\,\eta)\,\delta_h\Big)\Big)+d_h\,\Big(2\,q\,(k+\eta)\,(q+2\,\eta)\,\theta+\Big(q^2+4\,q\,\eta+2\,\eta^2+k\,(q+2\,\eta)\Big)\,\gamma_h^2+2\,\Big(2\,\eta^2\,\theta+q^2\,(\eta+\theta)+2\,q\,\eta\,(\eta+2\,\theta)+k\,\Big(q^2+2\,\eta\,\theta+2\,q\,(\eta+\theta)\Big)\Big)\,\delta_h+\Big(q^2+4\,q\,\eta+2\,\eta^2+2\,k\,(q+\eta)\Big)\,\delta_h^2+\gamma_h\,\Big(4\,\eta^2\,\theta+2\,q^2\,(\eta+\theta)+4\,q\,\eta\,(\eta+2\,\theta)+k\,\Big(q^2+4\,\eta\,\theta+3\,q\,(\eta+\theta)\Big)+\Big(3\,k\,q+2\,q^2+4\,k\,\eta+8\,q\,\eta+4\,\eta^2\Big)\,\delta_h\Big)\Big)+q\,\Big(\eta\,(k+q+2\,\eta)\,\gamma_h^2+(k+\eta)\,(q+2\,\eta)\,\delta_h\,(2\,\theta+\delta_h)+\gamma_h\,((k+2\,\eta)\,(q+2\,\eta)\,\theta+(2\,\eta\,(q+2\,\eta)+k\,(q+3\,\eta))\,\delta_h)\Big)\Big)\Big/\Big(d_h^6+d_h^5\,(k+2\,q+4\,\eta+2\,\theta+2\,\gamma_h+2\,\delta_h+(\lambda_h)^*)+d_h^4\,\Big(2\,k\,q+q^2+3\,k\,\eta+6\,q\,\eta+4\,\eta^2+2\,k\,\theta+4\,q\,\theta+8\,\eta\,\theta+\gamma_h^2+\delta_h^2+k\,(\lambda_h)^*+2\,q\,(\lambda_h)^*+3\,\eta\,(\lambda_h)^*+2\,\theta\,(\lambda_h)^*+2\,\delta_h\,(k+2\,q+4\,\eta+\theta+(\lambda_h)^*)+2\,\gamma_h\,(k+2\,q+4\,\eta+\theta+\delta_h+(\lambda_h)^*)\Big)+q\,\delta_h\,((q+2\,\eta)\,(2\,\theta+\delta_h)\,(k\,\eta+(k+\eta)\,(\lambda_h)^*)+\eta\,\gamma_h\,(k\,(q+2\,\eta)+(2\,k+q+2\,\eta)\,(\lambda_h)^*))+d_h^3\,\Big(k\,q^2+4\,k\,q\,\eta+2\,q^2\,\eta+2\,k\,\eta^2+4\,q\,\eta^2+4\,k\,q\,\theta+2\,q^2\,\theta+6\,k\,\eta\,\theta+12\,q\,\eta\,\theta+8\,\eta^2\,\theta+2\,k\,q\,(\lambda_h)^*+q^2\,(\lambda_h)^*+2\,k\,\eta\,(\lambda_h)^*+4\,q\,\eta\,(\lambda_h)^*+2\,\eta^2\,(\lambda_h)^*+2\,k\,\theta\,(\lambda_h)^*+4\,q\,\theta\,(\lambda_h)^*+6\,\eta\,\theta\,(\lambda_h)^*+\gamma_h^2\,(k+2\,q+4\,\eta+(\lambda_h)^*)+\delta_h^2\,(k+2\,q+4\,\eta+(\lambda_h)^*)+2\,\delta_h\,\Big(q^2+6\,q\,\eta+4\,\eta^2+2\,q\,\theta+4\,\eta\,\theta+k\,(2\,q+3\,\eta+\theta)+(k+2\,q+3\,\eta+\theta)\,(\lambda_h)^*\Big)+\gamma_h\,\Big(3\,k\,q+2\,q^2+6\,k\,\eta+12\,q\,\eta+8\,\eta^2+2\,k\,\theta+4\,q\,\theta+8\,\eta\,\theta+(2\,k+3\,q+6\,\eta+2\,\theta)\,(\lambda_h)^*+2\,\delta_h\,(k+2\,q+4\,\eta+(\lambda_h)^*)\Big)\Big)+d_h^2\,\Big(k\,q^2\,\eta+2\,k\,q\,\eta^2+2\,k\,q^2\,\theta+8\,k\,q\,\eta\,\theta+4\,q^2\,\eta\,\theta+4\,k\,\eta^2\,\theta+8\,q\,\eta^2\,\theta+k\,q^2\,(\lambda_h)^*+2\,k\,q\,\eta\,(\lambda_h)^*+q^2\,\eta\,(\lambda_h)^*+2\,q\,\eta^2\,(\lambda_h)^*+4\,k\,q\,\theta\,(\lambda_h)^*+2\,q^2\,\theta\,(\lambda_h)^*+4\,k\,\eta\,\theta\,(\lambda_h)^*+8\,q\,\eta\,\theta\,(\lambda_h)^*+4\,\eta^2\,\theta\,(\lambda_h)^*+\gamma_h^2\,\Big(q^2+6\,q\,\eta+4\,\eta^2+k\,(q+3\,\eta)+(k+q+3\,\eta)\,(\lambda_h)^*\Big)+\delta_h^2\,\Big(2\,k\,q+q^2+3\,k\,\eta+6\,q\,\eta+4\,\eta^2+(k+2\,q+3\,\eta)\,(\lambda_h)^*\Big)+2\,\delta_h\,\Big(2\,q^2\,\eta+4\,q\,\eta^2+q^2\,\theta+6\,q\,\eta\,\theta+4\,\eta^2\,\theta+k\,\Big(q^2+4\,q\,\eta+2\,\eta^2+2\,q\,\theta+3\,\eta\,\theta\Big)+\Big(q^2+4\,q\,\eta+2\,\eta^2+2\,q\,\theta+3\,\eta\,\theta+k\,(2\,q+2\,\eta+\theta)\Big)\,(\lambda_h)^*\Big)+\gamma_h\,\Big(k\,q^2+6\,k\,q\,\eta+4\,q^2\,\eta+4\,k\,\eta^2+8\,q\,\eta^2+3\,k\,q\,\theta+2\,q^2\,\theta+6\,k\,\eta\,\theta+12\,q\,\eta\,\theta+8\,\eta^2\,\theta+\Big(q^2+6\,q\,\eta+4\,\eta^2+3\,q\,\theta+6\,\eta\,\theta+2\,k\,(q+2\,\eta+\theta)\Big)\,(\lambda_h)^*+\delta_h\,\Big(3\,k\,q+2\,q^2+6\,k\,\eta+12\,q\,\eta+8\,\eta^2+(2\,k+3\,q+6\,\eta)\,(\lambda_h)^*\Big)\Big)\Big)+d_h\,\Big(2\,q\,(q+2\,\eta)\,\theta\,(k\,\eta+(k+\eta)\,(\lambda_h)^*)+2\,\eta\,\gamma_h^2\,(k\,(q+\eta)+q\,(q+2\,\eta)+(k+q+\eta)\,(\lambda_h)^*)+\delta_h^2\,\Big(2\,q\,\eta\,(q+2\,\eta)+k\,\Big(q^2+4\,q\,\eta+2\,\eta^2\Big)+\Big(q^2+4\,q\,\eta+2\,\eta^2+2\,k\,(q+\eta)\Big)\,(\lambda_h)^*\Big)+2\,\delta_h\,\Big(2\,q\,\eta\,(q+2\,\eta)\,\theta+k\,\Big(2\,\eta^2\,\theta+q^2\,(\eta+\theta)+2\,q\,\eta\,(\eta+2\,\theta)\Big)+\Big(2\,\eta^2\,\theta+q^2\,(\eta+\theta)+2\,q\,\eta\,(\eta+2\,\theta)+k\,\Big(q^2+2\,\eta\,\theta+2\,q\,(\eta+\theta)\Big)\Big)\,(\lambda_h)^*\Big)+\gamma_h\,\Big((q+2\,\eta)\,(2\,k\,\eta\,\theta+4\,q\,\eta\,\theta+k\,q\,(\eta+\theta))+(2\,k+q+2\,\eta)\,(2\,\eta\,\theta+q\,(\eta+\theta))\,(\lambda_h)^*+\delta_h\,\Big(4\,q\,\eta\,(q+2\,\eta)+k\,\Big(q^2+6\,q\,\eta+4\,\eta^2\Big)+\Big(q^2+6\,q\,\eta+4\,\eta^2+2\,k\,(q+2\,\eta)\Big)\,(\lambda_h)^*\Big)\Big)\Big)\Big)$$

Out[13]=
$$\Big(\Lambda\,\Big(d_h^4\,(\lambda_h)^* + d_h^3\,(k+2q+3\eta+\theta+\gamma_h+\delta_h)\,(\lambda_h)^* + d_h^2\,\Big(k\eta\theta + \Big(2kq+q^2+2k\eta+4q\eta+2\eta^2+k\theta+2q\theta + 3\eta\theta+(k+2q+3\eta)\,\gamma_h+(k+2q+3\eta)\,\delta_h\Big)\,(\lambda_h)^*\Big) + d_h\,\Big(2k\eta\,(q+\eta)\,\theta + \Big(kq^2+2kq\eta+q^2\eta+2q\eta^2+2kq\theta+q^2\theta+2k\eta\theta+4q\eta\theta + 2\eta^2\theta+\Big(q^2+4q\eta+2\eta^2+k\,(q+2\eta)\Big)\,\gamma_h+\Big(q^2+4q\eta+2\eta^2+2k\,(q+\eta)\Big)\,\delta_h\Big)\,(\lambda_h)^*\Big) + q\,(k\eta\,(q+2\eta)\,\theta + (\eta\,(k+q+2\eta)\,\gamma_h + (k+\eta)\,(q+2\eta)\,(\theta+\delta_h))\,(\lambda_h)^*)\Big)\Big) \Big/ \Big(d_h^6 + d_h^5\,(k+2q+4\eta+2\theta+2\gamma_h+2\delta_h+(\lambda_h)^*) + d_h^4\,\Big(2kq+q^2+3k\eta+6q\eta+4\eta^2+2k\theta+4q\theta+8\eta\theta+\gamma_h^2+\delta_h^2+k\,(\lambda_h)^*+2q\,(\lambda_h)^*+3\eta\,(\lambda_h)^* + 2\theta\,(\lambda_h)^*+2\delta_h\,(k+2q+4\eta+\theta+(\lambda_h)^*)+2\gamma_h\,(k+2q+4\eta+\theta+\delta_h+(\lambda_h)^*)\Big) + q\,\delta_h\,((q+2\eta)\,(2\theta+\delta_h)\,(k\eta+(k+\eta)\,(\lambda_h)^*)+\eta\,\gamma_h\,(k\,(q+2\eta)+(2k+q+2\eta)\,(\lambda_h)^*)) + d_h^3\,\Big(kq^2+4kq\eta+2q^2\eta+2k\eta^2+4q\eta^2+4kq\theta+2q^2\theta+6k\eta\theta+12q\eta\theta+8\eta^2\theta + 2kq\,(\lambda_h)^*+q^2\,(\lambda_h)^*+2k\eta\,(\lambda_h)^*+4q\eta\,(\lambda_h)^*+2\eta^2\,(\lambda_h)^*+2k\theta\,(\lambda_h)^* + 4q\theta\,(\lambda_h)^*+6\eta\theta\,(\lambda_h)^*+\gamma_h^2\,(k+2q+4\eta+(\lambda_h)^*)+\delta_h^2\,(k+2q+4\eta+(\lambda_h)^*) + 2\delta_h\,\Big(q^2+6q\eta+4\eta^2+2q\theta+4\eta\theta+k\,(2q+3\eta+\theta)+(k+2q+3\eta+\theta)\,(\lambda_h)^*\Big) + \gamma_h\,\Big(3kq+2q^2+6k\eta+12q\eta+8\eta^2+2k\theta+4q\theta+8\eta\theta + (2k+3q+6\eta+2\theta)\,(\lambda_h)^*+2\delta_h\,(k+2q+4\eta+(\lambda_h)^*)\Big)\Big) + d_h^2\,\Big(kq^2\eta+2kq\eta^2+2kq^2\theta+8kq\eta\theta+4q^2\eta\theta+4k\eta^2\theta+8q\eta^2\theta+kq^2\,(\lambda_h)^* + 2kq\eta\,(\lambda_h)^*+q^2\eta\,(\lambda_h)^*+2q\eta^2\,(\lambda_h)^*+4kq\theta\,(\lambda_h)^*+2q^2\theta\,(\lambda_h)^*+4k\eta\theta\,(\lambda_h)^* + 8q\eta\theta\,(\lambda_h)^*+4\eta^2\theta\,(\lambda_h)^*+\gamma_h^2\,\Big(q^2+6q\eta+4\eta^2+k\,(q+3\eta)+(k+q+3\eta)\,(\lambda_h)^*\Big) + \delta_h^2\,\Big(2kq+q^2+3k\eta+6q\eta+4\eta^2+(k+2q+3\eta)\,(\lambda_h)^*\Big) + 2\delta_h\,\Big(2q^2\eta+4q\eta^2+q^2\theta+6q\eta\theta+4\eta^2\theta+k\,\Big(q^2+4q\eta+2\eta^2+2q\theta+3\eta\theta\Big) + \Big(q^2+4q\eta+2\eta^2+2q\theta+3\eta\theta+k\,(2q+2\eta+\theta)\Big)\,(\lambda_h)^*\Big) + \gamma_h\,\Big(kq^2+6kq\eta+4q^2\eta+4k\eta^2+8q\eta^2+3kq\theta+2q^2\theta+6k\eta\theta+12q\eta\theta + 8\eta^2\theta+\Big(q^2+6q\eta+4\eta^2+3q\theta+6\eta\theta+2k\,(q+2\eta+\theta)\Big)\,(\lambda_h)^* + \delta_h\,\Big(3kq+2q^2+6k\eta+12q\eta+8\eta^2+(2k+3q+6\eta)\,(\lambda_h)^*\Big)\Big)\Big) + d_h\,\Big(2q\,(q+2\eta)\,\theta\,(k\eta+(k+\eta)\,(\lambda_h)^*)+2\eta\,\gamma_h^2\,(k\,(q+\eta)+q\,(q+2\eta)+(k+q+\eta)\,(\lambda_h)^*) + \delta_h^2\,\Big(2q\eta\,(q+2\eta)+k\,\Big(q^2+4q\eta+2\eta^2\Big)+\Big(q^2+4q\eta+2\eta^2+2k\,(q+\eta)\Big)\,(\lambda_h)^*\Big) + 2\delta_h\,\Big(2q\eta\,(q+2\eta)\,\theta+k\,\Big(2\eta^2\theta+q^2\,(\eta+\theta)+2q\eta\,(\eta+2\theta)\Big) + \Big(2\eta^2\theta+q^2\,(\eta+\theta)+2q\eta\,(\eta+2\theta)+k\,\Big(q^2+2\eta\theta+2q\,(\eta+\theta)\Big)\Big)\,(\lambda_h)^*\Big) + \gamma_h\,\Big((q+2\eta)\,(2k\eta\theta+4q\eta\theta+kq\,(\eta+\theta))+(2k+q+2\eta)\,(2\eta\theta+q\,(\eta+\theta))\,(\lambda_h)^* + \delta_h\,\Big(4q\eta\,(q+2\eta)+k\,\Big(q^2+6q\eta+4\eta^2\Big)+\Big(q^2+6q\eta+4\eta^2+2k\,(q+2\eta)\Big)\,(\lambda_h)^*\Big)\Big)\Big)\Big)$$

Out[14]=
$$\Big(\Lambda\,\gamma_h\,\Big(k\,q\,\eta\,\theta+2\,k\,\eta^2\,\theta+k\,\eta^2\,\delta_h+k\,q\,\theta\,(\lambda_h)^*+2\,k\,\eta\,\theta\,(\lambda_h)^*+q\,\eta\,\theta\,(\lambda_h)^*+2\,\eta^2\,\theta\,(\lambda_h)^*+d_h^3\,(\lambda_h)^*+k\,q\,\delta_h\,(\lambda_h)^*+k\,\eta\,\delta_h\,(\lambda_h)^*+q\,\eta\,\delta_h\,(\lambda_h)^*+\eta^2\,\delta_h\,(\lambda_h)^*+d_h^2\,(k+q+2\,\eta+\theta+\gamma_h+\delta_h)\,(\lambda_h)^*+\eta\,\gamma_h\,(k\,\eta+(k+q+\eta)\,(\lambda_h)^*)+d_h\,\Big(k\,\eta\,(\eta+\theta)+\Big(k\,q+k\,\eta+q\,\eta+\eta^2+k\,\theta+q\,\theta+3\,\eta\,\theta+(k+q+2\,\eta)\,\gamma_h+(k+q+2\,\eta)\,\delta_h\Big)\,(\lambda_h)^*\Big)\Big)\Big)\Big/$$
$$\Big(d_h^6+d_h^5\,(k+2\,q+4\,\eta+2\,\theta+2\,\gamma_h+2\,\delta_h+(\lambda_h)^*)+d_h^4\,\Big(2\,k\,q+q^2+3\,k\,\eta+6\,q\,\eta+4\,\eta^2+2\,k\,\theta+4\,q\,\theta+8\,\eta\,\theta+\gamma_h^2+\delta_h^2+k\,(\lambda_h)^*+2\,q\,(\lambda_h)^*+3\,\eta\,(\lambda_h)^*+2\,\theta\,(\lambda_h)^*+2\,\delta_h\,(k+2\,q+4\,\eta+\theta+(\lambda_h)^*)\Big)+2\,\gamma_h\,(k+2\,q+4\,\eta+\theta+\delta_h+(\lambda_h)^*)\Big)+q\,\delta_h\,((q+2\,\eta)\,(2\,\theta+\delta_h)\,(k\,\eta+(k+\eta)\,(\lambda_h)^*)+\eta\,\gamma_h\,(k\,(q+2\,\eta)+(2\,k+q+2\,\eta)\,(\lambda_h)^*))+d_h^3\,\Big(k\,q^2+4\,k\,q\,\eta+2\,q^2\,\eta+2\,k\,\eta^2+4\,q\,\eta^2+4\,k\,q\,\theta+2\,q^2\,\theta+6\,k\,\eta\,\theta+12\,q\,\eta\,\theta+8\,\eta^2\,\theta+2\,k\,q\,(\lambda_h)^*+q^2\,(\lambda_h)^*+2\,k\,\eta\,(\lambda_h)^*+4\,q\,\eta\,(\lambda_h)^*+2\,\eta^2\,(\lambda_h)^*+2\,k\,\theta\,(\lambda_h)^*+4\,q\,\theta\,(\lambda_h)^*+6\,\eta\,\theta\,(\lambda_h)^*+\gamma_h^2\,(k+2\,q+4\,\eta+(\lambda_h)^*)+\delta_h^2\,(k+2\,q+4\,\eta+(\lambda_h)^*)+2\,\delta_h\,\Big(q^2+6\,q\,\eta+4\,\eta^2+2\,q\,\theta+4\,\eta\,\theta+k\,(2\,q+3\,\eta+\theta)+(k+2\,q+3\,\eta+\theta)\,(\lambda_h)^*\Big)+\gamma_h\,\Big(3\,k\,q+2\,q^2+6\,k\,\eta+12\,q\,\eta+8\,\eta^2+2\,k\,\theta+4\,q\,\theta+8\,\eta\,\theta+(2\,k+3\,q+6\,\eta+2\,\theta)\,(\lambda_h)^*+2\,\delta_h\,(k+2\,q+4\,\eta+(\lambda_h)^*)\Big)\Big)+d_h^2\,\Big(k\,q^2\,\eta+2\,k\,q\,\eta^2+2\,k\,q^2\,\theta+8\,k\,q\,\eta\,\theta+4\,q^2\,\eta\,\theta+4\,k\,\eta^2\,\theta+8\,q\,\eta^2\,\theta+k\,q^2\,(\lambda_h)^*+2\,k\,q\,\eta\,(\lambda_h)^*+q^2\,\eta\,(\lambda_h)^*+2\,q\,\eta^2\,(\lambda_h)^*+4\,k\,q\,\theta\,(\lambda_h)^*+2\,q^2\,\theta\,(\lambda_h)^*+4\,k\,\eta\,\theta\,(\lambda_h)^*+8\,q\,\eta\,\theta\,(\lambda_h)^*+4\,\eta^2\,\theta\,(\lambda_h)^*+\gamma_h^2\,\Big(q^2+6\,q\,\eta+4\,\eta^2+k\,(q+3\,\eta)+(k+q+3\,\eta)\,(\lambda_h)^*\Big)+\delta_h^2\,\Big(2\,k\,q+q^2+3\,k\,\eta+6\,q\,\eta+4\,\eta^2+(k+2\,q+3\,\eta)\,(\lambda_h)^*\Big)+2\,\delta_h\,\Big(2\,q^2\,\eta+4\,q\,\eta^2+q^2\,\theta+6\,q\,\eta\,\theta+4\,\eta^2\,\theta+k\,\Big(q^2+4\,q\,\eta+2\,\eta^2+2\,q\,\theta+3\,\eta\,\theta\Big)+\Big(q^2+4\,q\,\eta+2\,\eta^2+2\,q\,\theta+3\,\eta\,\theta+k\,(2\,q+2\,\eta+\theta)\Big)\,(\lambda_h)^*\Big)+\gamma_h\,\Big(k\,q^2+6\,k\,q\,\eta+4\,q^2\,\eta+4\,k\,\eta^2+8\,q\,\eta^2+3\,k\,q\,\theta+2\,q^2\,\theta+6\,k\,\eta\,\theta+12\,q\,\eta\,\theta+8\,\eta^2\,\theta+\Big(q^2+6\,q\,\eta+4\,\eta^2+3\,q\,\theta+6\,\eta\,\theta+2\,k\,(q+2\,\eta+\theta)\Big)\,(\lambda_h)^*+\delta_h\,\Big(3\,k\,q+2\,q^2+6\,k\,\eta+12\,q\,\eta+8\,\eta^2+(2\,k+3\,q+6\,\eta)\,(\lambda_h)^*\Big)\Big)\Big)+d_h\,\Big(2\,q\,(q+2\,\eta)\,\theta\,(k\,\eta+(k+\eta)\,(\lambda_h)^*)+2\,\eta\,\gamma_h^2\,(k\,(q+\eta)+q\,(q+2\,\eta)+(k+q+\eta)\,(\lambda_h)^*)+\delta_h^2\,\Big(2\,q\,\eta\,(q+2\,\eta)+k\,\Big(q^2+4\,q\,\eta+2\,\eta^2\Big)+\Big(q^2+4\,q\,\eta+2\,\eta^2+2\,k\,(q+\eta)\Big)\,(\lambda_h)^*\Big)+2\,\delta_h\,\Big(2\,q\,\eta\,(q+2\,\eta)\,\theta+k\,\Big(2\,\eta^2\,\theta+q^2\,(\eta+\theta)+2\,q\,\eta\,(\eta+2\,\theta)\Big)+\Big(2\,\eta^2\,\theta+q^2\,(\eta+\theta)+2\,q\,\eta\,(\eta+2\,\theta)+k\,\Big(q^2+2\,\eta\,\theta+2\,q\,(\eta+\theta)\Big)\Big)\,(\lambda_h)^*\Big)+\gamma_h\,\Big((q+2\,\eta)\,(2\,k\,\eta\,\theta+4\,q\,\eta\,\theta+k\,q\,(\eta+\theta))+(2\,k+q+2\,\eta)\,(2\,\eta\,\theta+q\,(\eta+\theta))\,(\lambda_h)^*+\delta_h\,\Big(4\,q\,\eta\,(q+2\,\eta)+k\,\Big(q^2+6\,q\,\eta+4\,\eta^2\Big)+\Big(q^2+6\,q\,\eta+4\,\eta^2+2\,k\,(q+2\,\eta)\Big)\,(\lambda_h)^*\Big)\Big)\Big)\Big)$$

Out[15]=
$$\Big(\Lambda\,\Big(\eta\,d_h^4+2\,\eta\,d_h^3\,(q+\eta+\theta+\gamma_h+\delta_h)+\eta\,d_h^2\,\Big(q^2+2\,q\,\eta+4\,q\,\theta+4\,\eta\,\theta+\gamma_h^2+2\,(2\,q+2\,\eta+\theta)\,\delta_h+\delta_h^2+2\,\gamma_h\,(2\,q+2\,\eta+\theta+\delta_h)\Big)+d_h\,\Big(2\,\eta\,(q+\eta)\,\gamma_h^2+2\,\eta\,\Big(q\,(q+2\,\eta)\,\theta+\Big(q^2+2\,\eta\,\theta+2\,q\,(\eta+\theta)\Big)\,\delta_h+(q+\eta)\,\delta_h^2\Big)+\gamma_h\,\Big(2\,\eta\,\Big(q^2+2\,\eta\,\theta+2\,q\,(\eta+\theta)\Big)+4\,\eta\,(q+\eta)\,\delta_h+q\,(\eta+\theta)\,(\lambda_h)^*\Big)\Big)+q\,\Big(\eta\,(q+2\,\eta)\,\delta_h\,(2\,\theta+\delta_h)+\eta\,\gamma_h^2\,(q+2\,\eta+(\lambda_h)^*)+\gamma_h\,((q+2\,\eta)\,\theta\,(2\,\eta+(\lambda_h)^*)+\eta\,\delta_h\,(2\,q+4\,\eta+(\lambda_h)^*))\Big)\Big)\Big)\Big/\Big(d_h^6+d_h^5\,(k+2\,q+4\,\eta+2\,\theta+2\,\gamma_h+2\,\delta_h+(\lambda_h)^*)+d_h^4\,\Big(2\,k\,q+q^2+3\,k\,\eta+6\,q\,\eta+4\,\eta^2+2\,k\,\theta+4\,q\,\theta+8\,\eta\,\theta+\gamma_h^2+\delta_h^2+k\,(\lambda_h)^*+2\,q\,(\lambda_h)^*+3\,\eta\,(\lambda_h)^*+2\,\theta\,(\lambda_h)^*+2\,\delta_h\,(k+2\,q+4\,\eta+\theta+(\lambda_h)^*)+2\,\gamma_h\,(k+2\,q+4\,\eta+\theta+\delta_h+(\lambda_h)^*)\Big)+q\,\delta_h\,((q+2\,\eta)\,(2\,\theta+\delta_h)\,(k\,\eta+(k+\eta)\,(\lambda_h)^*)+\eta\,\gamma_h\,(k\,(q+2\,\eta)+(2\,k+q+2\,\eta)\,(\lambda_h)^*))+d_h^3\,\Big(k\,q^2+4\,k\,q\,\eta+2\,q^2\,\eta+2\,k\,\eta^2+4\,q\,\eta^2+4\,k\,q\,\theta+2\,q^2\,\theta+6\,k\,\eta\,\theta+12\,q\,\eta\,\theta+8\,\eta^2\,\theta+2\,k\,q\,(\lambda_h)^*+q^2\,(\lambda_h)^*+2\,k\,\eta\,(\lambda_h)^*+4\,q\,\eta\,(\lambda_h)^*+2\,\eta^2\,(\lambda_h)^*+2\,k\,\theta\,(\lambda_h)^*+4\,q\,\theta\,(\lambda_h)^*+6\,\eta\,\theta\,(\lambda_h)^*+\gamma_h^2\,(k+2\,q+4\,\eta+(\lambda_h)^*)+\delta_h^2\,(k+2\,q+4\,\eta+(\lambda_h)^*)+2\,\delta_h\,\Big(q^2+6\,q\,\eta+4\,\eta^2+2\,q\,\theta+4\,\eta\,\theta+k\,(2\,q+3\,\eta+\theta)+(k+2\,q+3\,\eta+\theta)\,(\lambda_h)^*\Big)+\gamma_h\,\Big(3\,k\,q+2\,q^2+6\,k\,\eta+12\,q\,\eta+8\,\eta^2+2\,k\,\theta+4\,q\,\theta+8\,\eta\,\theta+(2\,k+3\,q+6\,\eta+2\,\theta)\,(\lambda_h)^*+2\,\delta_h\,(k+2\,q+4\,\eta+(\lambda_h)^*)\Big)\Big)+d_h^2\,\Big(k\,q^2\,\eta+2\,k\,q\,\eta^2+2\,k\,q^2\,\theta+8\,k\,q\,\eta\,\theta+4\,q^2\,\eta\,\theta+4\,k\,\eta^2\,\theta+8\,q\,\eta^2\,\theta+k\,q^2\,(\lambda_h)^*+2\,k\,q\,\eta\,(\lambda_h)^*+q^2\,\eta\,(\lambda_h)^*+2\,q\,\eta^2\,(\lambda_h)^*+4\,k\,q\,\theta\,(\lambda_h)^*+2\,q^2\,\theta\,(\lambda_h)^*+4\,k\,\eta\,\theta\,(\lambda_h)^*+8\,q\,\eta\,\theta\,(\lambda_h)^*+4\,\eta^2\,\theta\,(\lambda_h)^*+\gamma_h^2\,\Big(q^2+6\,q\,\eta+4\,\eta^2+k\,(q+3\,\eta)+(k+q+3\,\eta)\,(\lambda_h)^*\Big)+\delta_h^2\,\Big(2\,k\,q+q^2+3\,k\,\eta+6\,q\,\eta+4\,\eta^2+(k+2\,q+3\,\eta)\,(\lambda_h)^*\Big)+2\,\delta_h\,\Big(2\,q^2\,\eta+4\,q\,\eta^2+q^2\,\theta+6\,q\,\eta\,\theta+4\,\eta^2\,\theta+k\,\Big(q^2+4\,q\,\eta+2\,\eta^2+2\,q\,\theta+3\,\eta\,\theta\Big)+\Big(q^2+4\,q\,\eta+2\,\eta^2+2\,q\,\theta+3\,\eta\,\theta+k\,(2\,q+2\,\eta+\theta)\Big)\,(\lambda_h)^*\Big)+\gamma_h\,\Big(k\,q^2+6\,k\,q\,\eta+4\,q^2\,\eta+4\,k\,\eta^2+8\,q\,\eta^2+3\,k\,q\,\theta+2\,q^2\,\theta+6\,k\,\eta\,\theta+12\,q\,\eta\,\theta+8\,\eta^2\,\theta+\Big(q^2+6\,q\,\eta+4\,\eta^2+3\,q\,\theta+6\,\eta\,\theta+2\,k\,(q+2\,\eta+\theta)\Big)\,(\lambda_h)^*+\delta_h\,\Big(3\,k\,q+2\,q^2+6\,k\,\eta+12\,q\,\eta+8\,\eta^2+(2\,k+3\,q+6\,\eta)\,(\lambda_h)^*\Big)\Big)\Big)+d_h\,\Big(2\,q\,(q+2\,\eta)\,\theta\,(k\,\eta+(k+\eta)\,(\lambda_h)^*)+2\,\eta\,\gamma_h^2\,(k\,(q+\eta)+q\,(q+2\,\eta)+(k+q+\eta)\,(\lambda_h)^*)+\delta_h^2\,\Big(2\,q\,\eta\,(q+2\,\eta)+k\,\Big(q^2+4\,q\,\eta+2\,\eta^2\Big)+\Big(q^2+4\,q\,\eta+2\,\eta^2+2\,k\,(q+\eta)\Big)\,(\lambda_h)^*\Big)+2\,\delta_h\,\Big(2\,q\,\eta\,(q+2\,\eta)\,\theta+k\,\Big(2\,\eta^2\,\theta+q^2\,(\eta+\theta)+2\,q\,\eta\,(\eta+2\,\theta)\Big)+\Big(2\,\eta^2\,\theta+q^2\,(\eta+\theta)+2\,q\,\eta\,(\eta+2\,\theta)+k\,\Big(q^2+2\,\eta\,\theta+2\,q\,(\eta+\theta)\Big)\Big)\,(\lambda_h)^*\Big)+\gamma_h\,\Big((q+2\,\eta)\,(2\,k\,\eta\,\theta+4\,q\,\eta\,\theta+k\,q\,(\eta+\theta))+(2\,k+q+2\,\eta)\,(2\,\eta\,\theta+q\,(\eta+\theta))\,(\lambda_h)^*+\delta_h\,\Big(4\,q\,\eta\,(q+2\,\eta)+k\,\Big(q^2+6\,q\,\eta+4\,\eta^2\Big)+\Big(q^2+6\,q\,\eta+4\,\eta^2+2\,k\,(q+2\,\eta)\Big)\,(\lambda_h)^*\Big)\Big)\Big)\Big)$$

Out[16]=
$$\Big(\Lambda\,\Big(d_h^3\,(k\,\eta+\theta\,(\lambda_h)^*)+d_h^2\,\Big(2\,k\,q\,\eta+2\,k\,\eta^2+k\,\eta\,\theta+k\,\eta\,\gamma_h+k\,\eta\,\delta_h+k\,\theta\,(\lambda_h)^*+2\,q\,\theta\,(\lambda_h)^*+3\,\eta\,\theta\,(\lambda_h)^*\Big)+d_h\,\Big(k\,q^2\,\eta+2\,k\,q\,\eta^2+2\,k\,q\,\eta\,\theta+2\,k\,\eta^2\,\theta+2\,k\,\eta\,(q+\eta)\,\gamma_h+2\,k\,\eta\,(q+\eta)\,\delta_h+2\,k\,q\,\theta\,(\lambda_h)^*+q^2\,\theta\,(\lambda_h)^*+2\,k\,\eta\,\theta\,(\lambda_h)^*+4\,q\,\eta\,\theta\,(\lambda_h)^*+2\,\eta^2\,\theta\,(\lambda_h)^*\Big)+q\,(k\,\eta\,\gamma_h\,(q+2\,\eta+(\lambda_h)^*)+(q+2\,\eta)\,(k\,\eta\,\theta+k\,\eta\,\delta_h+(k+\eta)\,\theta\,(\lambda_h)^*))\Big)\Big)\Big/\Big(d_h^6+d_h^5\,(k+2\,q+4\,\eta+2\,\theta+2\,\gamma_h+2\,\delta_h+(\lambda_h)^*)+d_h^4\,\Big(2\,k\,q+q^2+3\,k\,\eta+6\,q\,\eta+4\,\eta^2+2\,k\,\theta+4\,q\,\theta+8\,\eta\,\theta+\gamma_h^2+\delta_h^2+k\,(\lambda_h)^*+2\,q\,(\lambda_h)^*+3\,\eta\,(\lambda_h)^*+2\,\theta\,(\lambda_h)^*+2\,\delta_h\,(k+2\,q+4\,\eta+\theta+(\lambda_h)^*)+2\,\gamma_h\,(k+2\,q+4\,\eta+\theta+\delta_h+(\lambda_h)^*)\Big)+q\,\delta_h\,((q+2\,\eta)\,(2\,\theta+\delta_h)\,(k\,\eta+(k+\eta)\,(\lambda_h)^*)+\eta\,\gamma_h\,(k\,(q+2\,\eta)+(2\,k+q+2\,\eta)\,(\lambda_h)^*))+d_h^3\,\Big(k\,q^2+4\,k\,q\,\eta+2\,q^2\,\eta+2\,k\,\eta^2+4\,q\,\eta^2+4\,k\,q\,\theta+2\,q^2\,\theta+6\,k\,\eta\,\theta+12\,q\,\eta\,\theta+8\,\eta^2\,\theta+2\,k\,q\,(\lambda_h)^*+q^2\,(\lambda_h)^*+2\,k\,\eta\,(\lambda_h)^*+4\,q\,\eta\,(\lambda_h)^*+2\,\eta^2\,(\lambda_h)^*+2\,k\,\theta\,(\lambda_h)^*+4\,q\,\theta\,(\lambda_h)^*+6\,\eta\,\theta\,(\lambda_h)^*+\gamma_h^2\,(k+2\,q+4\,\eta+(\lambda_h)^*)+\delta_h^2\,(k+2\,q+4\,\eta+(\lambda_h)^*)+2\,\delta_h\,\Big(q^2+6\,q\,\eta+4\,\eta^2+2\,q\,\theta+4\,\eta\,\theta+k\,(2\,q+3\,\eta+\theta)+(k+2\,q+3\,\eta+\theta)\,(\lambda_h)^*\Big)+\gamma_h\,\Big(3\,k\,q+2\,q^2+6\,k\,\eta+12\,q\,\eta+8\,\eta^2+2\,k\,\theta+4\,q\,\theta+8\,\eta\,\theta+(2\,k+3\,q+6\,\eta+2\,\theta)\,(\lambda_h)^*+2\,\delta_h\,(k+2\,q+4\,\eta+(\lambda_h)^*)\Big)\Big)+d_h^2\,\Big(k\,q^2\,\eta+2\,k\,q\,\eta^2+2\,k\,q^2\,\theta+8\,k\,q\,\eta\,\theta+4\,q^2\,\eta\,\theta+4\,k\,\eta^2\,\theta+8\,q\,\eta^2\,\theta+k\,q^2\,(\lambda_h)^*+2\,k\,q\,\eta\,(\lambda_h)^*+q^2\,\eta\,(\lambda_h)^*+2\,q\,\eta^2\,(\lambda_h)^*+4\,k\,q\,\theta\,(\lambda_h)^*+2\,q^2\,\theta\,(\lambda_h)^*+4\,k\,\eta\,\theta\,(\lambda_h)^*+8\,q\,\eta\,\theta\,(\lambda_h)^*+4\,\eta^2\,\theta\,(\lambda_h)^*+\gamma_h^2\,\Big(q^2+6\,q\,\eta+4\,\eta^2+k\,(q+3\,\eta)+(k+q+3\,\eta)\,(\lambda_h)^*\Big)+\delta_h^2\,\Big(2\,k\,q+q^2+3\,k\,\eta+6\,q\,\eta+4\,\eta^2+(k+2\,q+3\,\eta)\,(\lambda_h)^*\Big)+2\,\delta_h\,\Big(2\,q^2\,\eta+4\,q\,\eta^2+q^2\,\theta+6\,q\,\eta\,\theta+4\,\eta^2\,\theta+k\,\Big(q^2+4\,q\,\eta+2\,\eta^2+2\,q\,\theta+3\,\eta\,\theta\Big)+\Big(q^2+4\,q\,\eta+2\,\eta^2+2\,q\,\theta+3\,\eta\,\theta+k\,(2\,q+2\,\eta+\theta)\Big)\,(\lambda_h)^*\Big)+\gamma_h\,\Big(k\,q^2+6\,k\,q\,\eta+4\,q^2\,\eta+4\,k\,\eta^2+8\,q\,\eta^2+3\,k\,q\,\theta+2\,q^2\,\theta+6\,k\,\eta\,\theta+12\,q\,\eta\,\theta+8\,\eta^2\,\theta+\Big(q^2+6\,q\,\eta+4\,\eta^2+3\,q\,\theta+6\,\eta\,\theta+2\,k\,(q+2\,\eta+\theta)\Big)\,(\lambda_h)^*+\delta_h\,\Big(3\,k\,q+2\,q^2+6\,k\,\eta+12\,q\,\eta+8\,\eta^2+(2\,k+3\,q+6\,\eta)\,(\lambda_h)^*\Big)\Big)\Big)+d_h\,\Big(2\,q\,(q+2\,\eta)\,\theta\,(k\,\eta+(k+\eta)\,(\lambda_h)^*)+2\,\eta\,\gamma_h^2\,(k\,(q+\eta)+q\,(q+2\,\eta)+(k+q+\eta)\,(\lambda_h)^*)+\delta_h^2\,\Big(2\,q\,\eta\,(q+2\,\eta)+k\,\Big(q^2+4\,q\,\eta+2\,\eta^2\Big)+\Big(q^2+4\,q\,\eta+2\,\eta^2+2\,k\,(q+\eta)\Big)\,(\lambda_h)^*\Big)+2\,\delta_h\,\Big(2\,q\,\eta\,(q+2\,\eta)\,\theta+k\,\Big(2\,\eta^2\,\theta+q^2\,(\eta+\theta)+2\,q\,\eta\,(\eta+2\,\theta)\Big)+\Big(2\,\eta^2\,\theta+q^2\,(\eta+\theta)+2\,q\,\eta\,(\eta+2\,\theta)+k\,\Big(q^2+2\,\eta\,\theta+2\,q\,(\eta+\theta)\Big)\Big)\,(\lambda_h)^*\Big)+\gamma_h\,\Big((q+2\,\eta)\,(2\,k\,\eta\,\theta+4\,q\,\eta\,\theta+k\,q\,(\eta+\theta))+(2\,k+q+2\,\eta)\,(2\,\eta\,\theta+q\,(\eta+\theta))\,(\lambda_h)^*+\delta_h\,\Big(4\,q\,\eta\,(q+2\,\eta)+k\,\Big(q^2+6\,q\,\eta+4\,\eta^2\Big)+\Big(q^2+6\,q\,\eta+4\,\eta^2+2\,k\,(q+2\,\eta)\Big)\,(\lambda_h)^*\Big)\Big)\Big)\Big)$$

Out[17]=
$$\Big(\Lambda\,\gamma_h\,\Big(k\,q\,\eta\,\theta+2\,k\,\eta^2\,\theta+k\,q\,\eta\,\delta_h+k\,\eta^2\,\delta_h+k\,q\,\theta\,(\lambda_h)^*+2\,k\,\eta\,\theta\,(\lambda_h)^*+q\,\eta\,\theta\,(\lambda_h)^*+2\,\eta^2\,\theta\,(\lambda_h)^*+k\,\eta\,\delta_h\,(\lambda_h)^*+\eta^2\,\delta_h\,(\lambda_h)^*+\eta\,\gamma_h\,(k\,(q+\eta)+(k+\eta)\,(\lambda_h)^*)+d_h^2\,(k\,\eta+(\eta+\theta)\,(\lambda_h)^*)+d_h\,\Big(k\,q\,\eta+k\,\eta^2+k\,\eta\,\theta+k\,\eta\,(\lambda_h)^*+\eta^2\,(\lambda_h)^*+k\,\theta\,(\lambda_h)^*+q\,\theta\,(\lambda_h)^*+3\,\eta\,\theta\,(\lambda_h)^*+\eta\,\gamma_h\,(k+(\lambda_h)^*)+\eta\,\delta_h\,(k+(\lambda_h)^*)\Big)\Big)\Big)\Big/$$
$$\Big(d_h^6+d_h^5\,(k+2\,q+4\,\eta+2\,\theta+2\,\gamma_h+2\,\delta_h+(\lambda_h)^*)+d_h^4\,\Big(2\,k\,q+q^2+3\,k\,\eta+6\,q\,\eta+4\,\eta^2+2\,k\,\theta+4\,q\,\theta+8\,\eta\,\theta+\gamma_h^2+\delta_h^2+k\,(\lambda_h)^*+2\,q\,(\lambda_h)^*+3\,\eta\,(\lambda_h)^*+2\,\theta\,(\lambda_h)^*+2\,\delta_h\,(k+2\,q+4\,\eta+\theta+(\lambda_h)^*)\Big)+2\,\gamma_h\,(k+2\,q+4\,\eta+\theta+\delta_h+(\lambda_h)^*)\Big)+q\,\delta_h\,((q+2\,\eta)\,(2\,\theta+\delta_h)\,(k\,\eta+(k+\eta)\,(\lambda_h)^*)+\eta\,\gamma_h\,(k\,(q+2\,\eta)+(2\,k+q+2\,\eta)\,(\lambda_h)^*))+d_h^3\,\Big(k\,q^2+4\,k\,q\,\eta+2\,q^2\,\eta+2\,k\,\eta^2+4\,q\,\eta^2+4\,k\,q\,\theta+2\,q^2\,\theta+6\,k\,\eta\,\theta+12\,q\,\eta\,\theta+8\,\eta^2\,\theta+2\,k\,q\,(\lambda_h)^*+q^2\,(\lambda_h)^*+2\,k\,\eta\,(\lambda_h)^*+4\,q\,\eta\,(\lambda_h)^*+2\,\eta^2\,(\lambda_h)^*+2\,k\,\theta\,(\lambda_h)^*+4\,q\,\theta\,(\lambda_h)^*+6\,\eta\,\theta\,(\lambda_h)^*+\gamma_h^2\,(k+2\,q+4\,\eta+(\lambda_h)^*)+\delta_h^2\,(k+2\,q+4\,\eta+(\lambda_h)^*)+2\,\delta_h\,\Big(q^2+6\,q\,\eta+4\,\eta^2+2\,q\,\theta+4\,\eta\,\theta+k\,(2\,q+3\,\eta+\theta)+(k+2\,q+3\,\eta+\theta)\,(\lambda_h)^*\Big)+\gamma_h\,\Big(3\,k\,q+2\,q^2+6\,k\,\eta+12\,q\,\eta+8\,\eta^2+2\,k\,\theta+4\,q\,\theta+8\,\eta\,\theta+(2\,k+3\,q+6\,\eta+2\,\theta)\,(\lambda_h)^*+2\,\delta_h\,(k+2\,q+4\,\eta+(\lambda_h)^*)\Big)\Big)+d_h^2\,\Big(k\,q^2\,\eta+2\,k\,q\,\eta^2+2\,k\,q^2\,\theta+8\,k\,q\,\eta\,\theta+4\,q^2\,\eta\,\theta+4\,k\,\eta^2\,\theta+8\,q\,\eta^2\,\theta+k\,q^2\,(\lambda_h)^*+2\,k\,q\,\eta\,(\lambda_h)^*+q^2\,\eta\,(\lambda_h)^*+2\,q\,\eta^2\,(\lambda_h)^*+4\,k\,q\,\theta\,(\lambda_h)^*+2\,q^2\,\theta\,(\lambda_h)^*+4\,k\,\eta\,\theta\,(\lambda_h)^*+8\,q\,\eta\,\theta\,(\lambda_h)^*+4\,\eta^2\,\theta\,(\lambda_h)^*+\gamma_h^2\,\Big(q^2+6\,q\,\eta+4\,\eta^2+k\,(q+3\,\eta)+(k+q+3\,\eta)\,(\lambda_h)^*\Big)+\delta_h^2\,\Big(2\,k\,q+q^2+3\,k\,\eta+6\,q\,\eta+4\,\eta^2+(k+2\,q+3\,\eta)\,(\lambda_h)^*\Big)+2\,\delta_h\,\Big(2\,q^2\,\eta+4\,q\,\eta^2+q^2\,\theta+6\,q\,\eta\,\theta+4\,\eta^2\,\theta+k\,\Big(q^2+4\,q\,\eta+2\,\eta^2+2\,q\,\theta+3\,\eta\,\theta\Big)+\Big(q^2+4\,q\,\eta+2\,\eta^2+2\,q\,\theta+3\,\eta\,\theta+k\,(2\,q+2\,\eta+\theta)\Big)\,(\lambda_h)^*\Big)+\gamma_h\,\Big(k\,q^2+6\,k\,q\,\eta+4\,q^2\,\eta+4\,k\,\eta^2+8\,q\,\eta^2+3\,k\,q\,\theta+2\,q^2\,\theta+6\,k\,\eta\,\theta+12\,q\,\eta\,\theta+8\,\eta^2\,\theta+\Big(q^2+6\,q\,\eta+4\,\eta^2+3\,q\,\theta+6\,\eta\,\theta+2\,k\,(q+2\,\eta+\theta)\Big)\,(\lambda_h)^*+\delta_h\,\Big(3\,k\,q+2\,q^2+6\,k\,\eta+12\,q\,\eta+8\,\eta^2+(2\,k+3\,q+6\,\eta)\,(\lambda_h)^*\Big)\Big)\Big)+d_h\,\Big(2\,q\,(q+2\,\eta)\,\theta\,(k\,\eta+(k+\eta)\,(\lambda_h)^*)+2\,\eta\,\gamma_h^2\,(k\,(q+\eta)+q\,(q+2\,\eta)+(k+q+\eta)\,(\lambda_h)^*)+\delta_h^2\,\Big(2\,q\,\eta\,(q+2\,\eta)+k\,\Big(q^2+4\,q\,\eta+2\,\eta^2\Big)+\Big(q^2+4\,q\,\eta+2\,\eta^2+2\,k\,(q+\eta)\Big)\,(\lambda_h)^*\Big)+2\,\delta_h\,\Big(2\,q\,\eta\,(q+2\,\eta)\,\theta+k\,\Big(2\,\eta^2\,\theta+q^2\,(\eta+\theta)+2\,q\,\eta\,(\eta+2\,\theta)\Big)+\Big(2\,\eta^2\,\theta+q^2\,(\eta+\theta)+2\,q\,\eta\,(\eta+2\,\theta)+k\,\Big(q^2+2\,\eta\,\theta+2\,q\,(\eta+\theta)\Big)\Big)\,(\lambda_h)^*\Big)+\gamma_h\,\Big((q+2\,\eta)\,(2\,k\,\eta\,\theta+4\,q\,\eta\,\theta+k\,q\,(\eta+\theta))+(2\,k+q+2\,\eta)\,(2\,\eta\,\theta+q\,(\eta+\theta))\,(\lambda_h)^*+\delta_h\,\Big(4\,q\,\eta\,(q+2\,\eta)+k\,\Big(q^2+6\,q\,\eta+4\,\eta^2\Big)+\Big(q^2+6\,q\,\eta+4\,\eta^2+2\,k\,(q+2\,\eta)\Big)\,(\lambda_h)^*\Big)\Big)\Big)\Big)$$

In[11]:=
```
Solve[{ϕ - λv* * 1* - dv * 1* == 0,
  λv* * 1* - (dv + σ) * n* == 0,
  σ * n* - dv * m* == 0}, {1*, n*, m*}]
```

In[18]:=
$$1^* = \frac{\phi}{dv + (\lambda_v)^*}$$
$$n^* = \frac{\phi\,(\lambda_v)^*}{(\sigma + d_v)\,(dv + (\lambda_v)^*)}$$
$$m^* = \frac{\sigma\,\phi\,(\lambda_v)^*}{dv\,(\sigma + d_v)\,(dv + (\lambda_v)^*)}$$

Out[18]=
$$\frac{\phi}{dv + (\lambda_v)^*}$$

Out[19]=
$$\frac{\phi\ (\lambda_v)^*}{(\sigma + d_v)\ (dv + (\lambda_v)^*)}$$

Out[20]=
$$\frac{\sigma\ \phi\ (\lambda_v)^*}{dv\ (\sigma + d_v)\ (dv + (\lambda_v)^*)}$$

In[1]:=
```
dr = (dh^6 + dh^5 (k + 2 q + 4 η + 2 θ + 2 γh + 2 δh + (λh)*) +
    dh^4 (2 k q + q^2 + 3 k η + 6 q η + 4 η^2 + 2 k θ + 4 q θ + 8 η θ + γh^2 + δh^2 + k (λh)* + 2 q (λh)* + 3 η (λh)* +
      2 θ (λh)* + 2 δh (k + 2 q + 4 η + θ + (λh)*) + 2 γh (k + 2 q + 4 η + θ + δh + (λh)*)) +
    q δh ((q + 2 η) (2 θ + δh) (k η + (k + η) (λh)*) + η γh (k (q + 2 η) + (2 k + q + 2 η) (λh)*)) +
    dh^3 (k q^2 + 4 k q η + 2 q^2 η + 2 k η^2 + 4 q η^2 + 4 k q θ + 2 q^2 θ + 6 k η θ + 12 q η θ + 8 η^2 θ +
      2 k q (λh)* + q^2 (λh)* + 2 k η (λh)* + 4 q η (λh)* + 2 η^2 (λh)* + 2 k θ (λh)* +
      4 q θ (λh)* + 6 η θ (λh)* + γh^2 (k + 2 q + 4 η + (λh)*) + δh^2 (k + 2 q + 4 η + (λh)*) +
      2 δh (q^2 + 6 q η + 4 η^2 + 2 q θ + 4 η θ + k (2 q + 3 η + θ) + (k + 2 q + 3 η + θ) (λh)*) +
      γh (3 k q + 2 q^2 + 6 k η + 12 q η + 8 η^2 + 2 k θ + 4 q θ + 8 η θ +
        (2 k + 3 q + 6 η + 2 θ) (λh)* + 2 δh (k + 2 q + 4 η + (λh)*))) +
    dh^2 (k q^2 η + 2 k q η^2 + 2 k q^2 θ + 8 k q η θ + 4 q^2 η θ + 4 k η^2 θ + 8 q η^2 θ + k q^2 (λh)* +
      2 k q η (λh)* + q^2 η (λh)* + 2 q η^2 (λh)* + 4 k q θ (λh)* + 2 q^2 θ (λh)* + 4 k η θ (λh)* +
      8 q η θ (λh)* + 4 η^2 θ (λh)* + γh^2 (q^2 + 6 q η + 4 η^2 + k (q + 3 η) + (k + q + 3 η) (λh)*) +
      δh^2 (2 k q + q^2 + 3 k η + 6 q η + 4 η^2 + (k + 2 q + 3 η) (λh)*) +
      2 δh (2 q^2 η + 4 q η^2 + q^2 θ + 6 q η θ + 4 η^2 θ + k (q^2 + 4 q η + 2 η^2 + 2 q θ + 3 η θ) +
        (q^2 + 4 q η + 2 η^2 + 2 q θ + 3 η θ + k (2 q + 2 η + θ)) (λh)*) +
      γh (k q^2 + 6 k q η + 4 q^2 η + 4 k η^2 + 8 q η^2 + 3 k q θ + 2 q^2 θ + 6 k η θ + 12 q η θ +
        8 η^2 θ + (q^2 + 6 q η + 4 η^2 + 3 q θ + 6 η θ + 2 k (q + 2 η + θ)) (λh)* +
        δh (3 k q + 2 q^2 + 6 k η + 12 q η + 8 η^2 + (2 k + 3 q + 6 η) (λh)*))) +
    dh (2 q (q + 2 η) θ (k η + (k + η) (λh)*) + 2 η γh^2 (k (q + η) + q (q + 2 η) + (k + q + η) (λh)*) +
      δh^2 (2 q η (q + 2 η) + k (q^2 + 4 q η + 2 η^2) + (q^2 + 4 q η + 2 η^2 + 2 k (q + η)) (λh)*) +
      2 δh (2 q η (q + 2 η) θ + k (2 η^2 θ + q^2 (η + θ) + 2 q η (η + 2 θ)) +
        (2 η^2 θ + q^2 (η + θ) + 2 q η (η + 2 θ) + k (q^2 + 2 η θ + 2 q (η + θ))) (λh)*) +
      γh ((q + 2 η) (2 k η θ + 4 q η θ + k q (η + θ)) + (2 k + q + 2 η) (2 η θ + q (η + θ)) (λh)* +
        δh (4 q η (q + 2 η) + k (q^2 + 6 q η + 4 η^2) + (q^2 + 6 q η + 4 η^2 + 2 k (q + 2 η)) (λh)*))))
```

Out[1]=
$$
\begin{aligned}
&d_h^6 + d_h^5\,(k + 2\,q + 4\,\eta + 2\,\theta + 2\,\gamma_h + 2\,\delta_h + (\lambda_h)^*) + \\
&\quad d_h^4\,\big(2\,k\,q + q^2 + 3\,k\,\eta + 6\,q\,\eta + 4\,\eta^2 + 2\,k\,\theta + 4\,q\,\theta + 8\,\eta\,\theta + \gamma_h^2 + \delta_h^2 + k\,(\lambda_h)^* + 2\,q\,(\lambda_h)^* + 3\,\eta\,(\lambda_h)^* + \\
&\qquad 2\,\theta\,(\lambda_h)^* + 2\,\delta_h\,(k + 2\,q + 4\,\eta + \theta + (\lambda_h)^*) + 2\,\gamma_h\,(k + 2\,q + 4\,\eta + \theta + \delta_h + (\lambda_h)^*)\big) + \\
&\quad q\,\delta_h\,((q + 2\,\eta)\,(2\,\theta + \delta_h)\,(k\,\eta + (k + \eta)\,(\lambda_h)^*) + \eta\,\gamma_h\,(k\,(q + 2\,\eta) + (2\,k + q + 2\,\eta)\,(\lambda_h)^*)) + \\
&\quad d_h^3\,\big(k\,q^2 + 4\,k\,q\,\eta + 2\,q^2\,\eta + 2\,k\,\eta^2 + 4\,q\,\eta^2 + 4\,k\,q\,\theta + 2\,q^2\,\theta + 6\,k\,\eta\,\theta + 12\,q\,\eta\,\theta + \\
&\qquad 8\,\eta^2\,\theta + 2\,k\,q\,(\lambda_h)^* + q^2\,(\lambda_h)^* + 2\,k\,\eta\,(\lambda_h)^* + 4\,q\,\eta\,(\lambda_h)^* + 2\,\eta^2\,(\lambda_h)^* + 2\,k\,\theta\,(\lambda_h)^* + \\
&\qquad 4\,q\,\theta\,(\lambda_h)^* + 6\,\eta\,\theta\,(\lambda_h)^* + \gamma_h^2\,(k + 2\,q + 4\,\eta + (\lambda_h)^*) + \delta_h^2\,(k + 2\,q + 4\,\eta + (\lambda_h)^*) + \\
&\qquad 2\,\delta_h\,\big(q^2 + 6\,q\,\eta + 4\,\eta^2 + 2\,q\,\theta + 4\,\eta\,\theta + k\,(2\,q + 3\,\eta + \theta) + (k + 2\,q + 3\,\eta + \theta)\,(\lambda_h)^*\big) + \\
&\qquad \gamma_h\,\big(3\,k\,q + 2\,q^2 + 6\,k\,\eta + 12\,q\,\eta + 8\,\eta^2 + 2\,k\,\theta + 4\,q\,\theta + 8\,\eta\,\theta + \\
&\qquad\quad (2\,k + 3\,q + 6\,\eta + 2\,\theta)\,(\lambda_h)^* + 2\,\delta_h\,(k + 2\,q + 4\,\eta + (\lambda_h)^*)\big)\big) + \\
&\quad d_h^2\,\big(k\,q^2\,\eta + 2\,k\,q\,\eta^2 + 2\,k\,q^2\,\theta + 8\,k\,q\,\eta\,\theta + 4\,q^2\,\eta\,\theta + 4\,k\,\eta^2\,\theta + 8\,q\,\eta^2\,\theta + k\,q^2\,(\lambda_h)^* + \\
&\qquad 2\,k\,q\,\eta\,(\lambda_h)^* + q^2\,\eta\,(\lambda_h)^* + 2\,q\,\eta^2\,(\lambda_h)^* + 4\,k\,q\,\theta\,(\lambda_h)^* + 2\,q^2\,\theta\,(\lambda_h)^* + 4\,k\,\eta\,\theta\,(\lambda_h)^* + \\
&\qquad 8\,q\,\eta\,\theta\,(\lambda_h)^* + 4\,\eta^2\,\theta\,(\lambda_h)^* + \gamma_h^2\,\big(q^2 + 6\,q\,\eta + 4\,\eta^2 + k\,(q + 3\,\eta) + (k + q + 3\,\eta)\,(\lambda_h)^*\big) + \\
&\qquad \delta_h^2\,\big(2\,k\,q + q^2 + 3\,k\,\eta + 6\,q\,\eta + 4\,\eta^2 + (k + 2\,q + 3\,\eta)\,(\lambda_h)^*\big) + \\
&\qquad 2\,\delta_h\,\big(2\,q^2\,\eta + 4\,q\,\eta^2 + q^2\,\theta + 6\,q\,\eta\,\theta + 4\,\eta^2\,\theta + k\,\big(q^2 + 4\,q\,\eta + 2\,\eta^2 + 2\,q\,\theta + 3\,\eta\,\theta\big) + \\
&\qquad\quad \big(q^2 + 4\,q\,\eta + 2\,\eta^2 + 2\,q\,\theta + 3\,\eta\,\theta + k\,(2\,q + 2\,\eta + \theta)\big)\,(\lambda_h)^*\big) + \\
&\qquad \gamma_h\,\big(k\,q^2 + 6\,k\,q\,\eta + 4\,q^2\,\eta + 4\,k\,\eta^2 + 8\,q\,\eta^2 + 3\,k\,q\,\theta + 2\,q^2\,\theta + 6\,k\,\eta\,\theta + 12\,q\,\eta\,\theta + \\
&\qquad\quad 8\,\eta^2\,\theta + \big(q^2 + 6\,q\,\eta + 4\,\eta^2 + 3\,q\,\theta + 6\,\eta\,\theta + 2\,k\,(q + 2\,\eta + \theta)\big)\,(\lambda_h)^* + \\
&\qquad\quad \delta_h\,\big(3\,k\,q + 2\,q^2 + 6\,k\,\eta + 12\,q\,\eta + 8\,\eta^2 + (2\,k + 3\,q + 6\,\eta)\,(\lambda_h)^*\big)\big)\big) + \\
&\quad d_h\,\big(2\,q\,(q + 2\,\eta)\,\theta\,(k\,\eta + (k + \eta)\,(\lambda_h)^*) + 2\,\eta\,\gamma_h^2\,(k\,(q + \eta) + q\,(q + 2\,\eta) + (k + q + \eta)\,(\lambda_h)^*) + \\
&\qquad \delta_h^2\,\big(2\,q\,\eta\,(q + 2\,\eta) + k\,\big(q^2 + 4\,q\,\eta + 2\,\eta^2\big) + \big(q^2 + 4\,q\,\eta + 2\,\eta^2 + 2\,k\,(q + \eta)\big)\,(\lambda_h)^*\big) + \\
&\qquad 2\,\delta_h\,\big(2\,q\,\eta\,(q + 2\,\eta)\,\theta + k\,\big(2\,\eta^2\,\theta + q^2\,(\eta + \theta) + 2\,q\,\eta\,(\eta + 2\,\theta)\big) + \\
&\qquad\quad \big(2\,\eta^2\,\theta + q^2\,(\eta + \theta) + 2\,q\,\eta\,(\eta + 2\,\theta) + k\,\big(q^2 + 2\,\eta\,\theta + 2\,q\,(\eta + \theta)\big)\big)\,(\lambda_h)^*\big) + \\
&\qquad \gamma_h\,\big((q + 2\,\eta)\,(2\,k\,\eta\,\theta + 4\,q\,\eta\,\theta + k\,q\,(\eta + \theta)) + (2\,k + q + 2\,\eta)\,(2\,\eta\,\theta + q\,(\eta + \theta))\,(\lambda_h)^* + \\
&\qquad\quad \delta_h\,\big(4\,q\,\eta\,(q + 2\,\eta) + k\,\big(q^2 + 6\,q\,\eta + 4\,\eta^2\big) + \big(q^2 + 6\,q\,\eta + 4\,\eta^2 + 2\,k\,(q + 2\,\eta)\big)\,(\lambda_h)^*\big)\big)\big)
\end{aligned}
$$

In[2]:=
```
K1 = Coefficient[dr, (λh)*, 0]
```

Out[2]=
$$2\,k\,q^2\,\eta\,\Theta\,d_h + 4\,k\,q\,\eta^2\,\Theta\,d_h + k\,q^2\,\eta\,d_h^2 + 2\,k\,q\,\eta^2\,d_h^2 + 2\,k\,q^2\,\Theta\,d_h^2 + 8\,k\,q\,\eta\,\Theta\,d_h^2 + 4\,q^2\,\eta\,\Theta\,d_h^2 +$$
$$4\,k\,\eta^2\,\Theta\,d_h^2 + 8\,q\,\eta^2\,\Theta\,d_h^2 + k\,q^2\,d_h^3 + 4\,k\,q\,\eta\,d_h^3 + 2\,q^2\,\eta\,d_h^3 + 2\,k\,\eta^2\,d_h^3 + 4\,q\,\eta^2\,d_h^3 + 4\,k\,q\,\Theta\,d_h^3 +$$
$$2\,q^2\,\Theta\,d_h^3 + 6\,k\,\eta\,\Theta\,d_h^3 + 12\,q\,\eta\,\Theta\,d_h^3 + 8\,\eta^2\,\Theta\,d_h^3 + 2\,k\,q\,d_h^4 + q^2\,d_h^4 + 3\,k\,\eta\,d_h^4 + 6\,q\,\eta\,d_h^4 + 4\,\eta^2\,d_h^4 +$$
$$2\,k\,\Theta\,d_h^4 + 4\,q\,\Theta\,d_h^4 + 8\,\eta\,\Theta\,d_h^4 + k\,d_h^5 + 2\,q\,d_h^5 + 4\,\eta\,d_h^5 + 2\,\Theta\,d_h^5 + d_h^6 + k\,q^2\,\eta\,d_h\,\gamma_h + 2\,k\,q\,\eta^2\,d_h\,\gamma_h +$$
$$k\,q^2\,\Theta\,d_h\,\gamma_h + 4\,k\,q\,\eta\,\Theta\,d_h\,\gamma_h + 4\,q^2\,\eta\,\Theta\,d_h\,\gamma_h + 4\,k\,\eta^2\,\Theta\,d_h\,\gamma_h + 8\,q\,\eta^2\,\Theta\,d_h\,\gamma_h + k\,q^2\,d_h^2\,\gamma_h +$$
$$6\,k\,q\,\eta\,d_h^2\,\gamma_h + 4\,q^2\,\eta\,d_h^2\,\gamma_h + 4\,k\,\eta^2\,d_h^2\,\gamma_h + 8\,q\,\eta^2\,d_h^2\,\gamma_h + 3\,k\,q\,\Theta\,d_h^2\,\gamma_h + 2\,q^2\,\Theta\,d_h^2\,\gamma_h + 6\,k\,\eta\,\Theta\,d_h^2\,\gamma_h +$$
$$12\,q\,\eta\,\Theta\,d_h^2\,\gamma_h + 8\,\eta^2\,\Theta\,d_h^2\,\gamma_h + 3\,k\,q\,d_h^3\,\gamma_h + 2\,q^2\,d_h^3\,\gamma_h + 6\,k\,\eta\,d_h^3\,\gamma_h + 12\,q\,\eta\,d_h^3\,\gamma_h + 8\,\eta^2\,d_h^3\,\gamma_h +$$
$$2\,k\,\Theta\,d_h^3\,\gamma_h + 4\,q\,\Theta\,d_h^3\,\gamma_h + 8\,\eta\,\Theta\,d_h^3\,\gamma_h + 2\,k\,d_h^4\,\gamma_h + 4\,q\,d_h^4\,\gamma_h + 8\,\eta\,d_h^4\,\gamma_h + 2\,\Theta\,d_h^4\,\gamma_h + 2\,d_h^5\,\gamma_h +$$
$$2\,k\,q\,\eta\,d_h\,\gamma_h^2 + 2\,q^2\,\eta\,d_h\,\gamma_h^2 + 2\,k\,\eta^2\,d_h\,\gamma_h^2 + 4\,q\,\eta^2\,d_h\,\gamma_h^2 + k\,q\,d_h^2\,\gamma_h^2 + q^2\,d_h^2\,\gamma_h^2 + 3\,k\,\eta\,d_h^2\,\gamma_h^2 +$$
$$6\,q\,\eta\,d_h^2\,\gamma_h^2 + 4\,\eta^2\,d_h^2\,\gamma_h^2 + k\,d_h^3\,\gamma_h^2 + 2\,q\,d_h^3\,\gamma_h^2 + 4\,\eta\,d_h^3\,\gamma_h^2 + d_h^4\,\gamma_h^2 + 2\,k\,q^2\,\eta\,\Theta\,\delta_h + 4\,k\,q\,\eta^2\,\Theta\,\delta_h +$$
$$2\,k\,q^2\,\eta\,d_h\,\delta_h + 4\,k\,q\,\eta^2\,d_h\,\delta_h + 2\,k\,q^2\,\Theta\,d_h\,\delta_h + 8\,k\,q\,\eta\,\Theta\,d_h\,\delta_h + 4\,q^2\,\eta\,\Theta\,d_h\,\delta_h + 4\,k\,\eta^2\,\Theta\,d_h\,\delta_h +$$
$$8\,q\,\eta^2\,\Theta\,d_h\,\delta_h + 2\,k\,q^2\,d_h^2\,\delta_h + 8\,k\,q\,\eta\,d_h^2\,\delta_h + 4\,q^2\,\eta\,d_h^2\,\delta_h + 4\,k\,\eta^2\,d_h^2\,\delta_h + 8\,q\,\eta^2\,d_h^2\,\delta_h + 4\,k\,q\,\Theta\,d_h^2\,\delta_h +$$
$$2\,q^2\,\Theta\,d_h^2\,\delta_h + 6\,k\,\eta\,\Theta\,d_h^2\,\delta_h + 12\,q\,\eta\,\Theta\,d_h^2\,\delta_h + 8\,\eta^2\,\Theta\,d_h^2\,\delta_h + 4\,k\,q\,d_h^3\,\delta_h + 2\,q^2\,d_h^3\,\delta_h + 6\,k\,\eta\,d_h^3\,\delta_h +$$
$$12\,q\,\eta\,d_h^3\,\delta_h + 8\,\eta^2\,d_h^3\,\delta_h + 2\,k\,\Theta\,d_h^3\,\delta_h + 4\,q\,\Theta\,d_h^3\,\delta_h + 8\,\eta\,\Theta\,d_h^3\,\delta_h + 2\,k\,d_h^4\,\delta_h + 4\,q\,d_h^4\,\delta_h +$$
$$8\,\eta\,d_h^4\,\delta_h + 2\,\Theta\,d_h^4\,\delta_h + 2\,d_h^5\,\delta_h + k\,q^2\,\eta\,\gamma_h\,\delta_h + 2\,k\,q\,\eta^2\,\gamma_h\,\delta_h + k\,q^2\,d_h\,\gamma_h\,\delta_h + 6\,k\,q\,\eta\,d_h\,\gamma_h\,\delta_h +$$
$$4\,q^2\,\eta\,d_h\,\gamma_h\,\delta_h + 4\,k\,\eta^2\,d_h\,\gamma_h\,\delta_h + 8\,q\,\eta^2\,d_h\,\gamma_h\,\delta_h + 3\,k\,q\,d_h^2\,\gamma_h\,\delta_h + 2\,q^2\,d_h^2\,\gamma_h\,\delta_h + 6\,k\,\eta\,d_h^2\,\gamma_h\,\delta_h +$$
$$12\,q\,\eta\,d_h^2\,\gamma_h\,\delta_h + 8\,\eta^2\,d_h^2\,\gamma_h\,\delta_h + 2\,k\,d_h^3\,\gamma_h\,\delta_h + 4\,q\,d_h^3\,\gamma_h\,\delta_h + 8\,\eta\,d_h^3\,\gamma_h\,\delta_h + 2\,d_h^4\,\gamma_h\,\delta_h +$$
$$k\,q^2\,\eta\,\delta_h^2 + 2\,k\,q\,\eta^2\,\delta_h^2 + k\,q^2\,d_h\,\delta_h^2 + 4\,k\,q\,\eta\,d_h\,\delta_h^2 + 2\,q^2\,\eta\,d_h\,\delta_h^2 + 2\,k\,\eta^2\,d_h\,\delta_h^2 + 4\,q\,\eta^2\,d_h\,\delta_h^2 +$$
$$2\,k\,q\,d_h^2\,\delta_h^2 + q^2\,d_h^2\,\delta_h^2 + 3\,k\,\eta\,d_h^2\,\delta_h^2 + 6\,q\,\eta\,d_h^2\,\delta_h^2 + 4\,\eta^2\,d_h^2\,\delta_h^2 + k\,d_h^3\,\delta_h^2 + 2\,q\,d_h^3\,\delta_h^2 + 4\,\eta\,d_h^3\,\delta_h^2 + d_h^4\,\delta_h^2$$

In[5]:=
```
K2 = Coefficient[dr, (λh)*, 1]
```

Out[5]=
$$2\,k\,q^2\,\Theta\,d_h + 4\,k\,q\,\eta\,\Theta\,d_h + 2\,q^2\,\eta\,\Theta\,d_h + 4\,q\,\eta^2\,\Theta\,d_h + k\,q^2\,d_h^2 + 2\,k\,q\,\eta\,d_h^2 + q^2\,\eta\,d_h^2 + 2\,q\,\eta^2\,d_h^2 + 4\,k\,q\,\Theta\,d_h^2 +$$
$$2\,q^2\,\Theta\,d_h^2 + 4\,k\,\eta\,\Theta\,d_h^2 + 8\,q\,\eta\,\Theta\,d_h^2 + 4\,\eta^2\,\Theta\,d_h^2 + 2\,k\,q\,d_h^3 + q^2\,d_h^3 + 2\,k\,\eta\,d_h^3 + 4\,q\,\eta\,d_h^3 + 2\,\eta^2\,d_h^3 +$$
$$2\,k\,\Theta\,d_h^3 + 4\,q\,\Theta\,d_h^3 + 6\,\eta\,\Theta\,d_h^3 + k\,d_h^4 + 2\,q\,d_h^4 + 3\,\eta\,d_h^4 + 2\,\Theta\,d_h^4 + d_h^5 + 2\,k\,q\,\eta\,d_h\,\gamma_h + q^2\,\eta\,d_h\,\gamma_h +$$
$$2\,q\,\eta^2\,d_h\,\gamma_h + 2\,k\,q\,\Theta\,d_h\,\gamma_h + q^2\,\Theta\,d_h\,\gamma_h + 4\,k\,\eta\,\Theta\,d_h\,\gamma_h + 4\,q\,\eta\,\Theta\,d_h\,\gamma_h + 4\,\eta^2\,\Theta\,d_h\,\gamma_h + 2\,k\,q\,d_h^2\,\gamma_h +$$
$$q^2\,d_h^2\,\gamma_h + 4\,k\,\eta\,d_h^2\,\gamma_h + 6\,q\,\eta\,d_h^2\,\gamma_h + 4\,\eta^2\,d_h^2\,\gamma_h + 2\,k\,\Theta\,d_h^2\,\gamma_h + 3\,q\,\Theta\,d_h^2\,\gamma_h + 6\,\eta\,\Theta\,d_h^2\,\gamma_h + 2\,k\,d_h^3\,\gamma_h +$$
$$3\,q\,d_h^3\,\gamma_h + 6\,\eta\,d_h^3\,\gamma_h + 2\,\Theta\,d_h^3\,\gamma_h + 2\,d_h^4\,\gamma_h + 2\,k\,\eta\,d_h\,\gamma_h^2 + 2\,q\,\eta\,d_h\,\gamma_h^2 + 2\,\eta^2\,d_h\,\gamma_h^2 + k\,d_h^2\,\gamma_h^2 + q\,d_h^2\,\gamma_h^2 +$$
$$3\,\eta\,d_h^2\,\gamma_h^2 + d_h^3\,\gamma_h^2 + 2\,k\,q^2\,\Theta\,\delta_h + 4\,k\,q\,\eta\,\Theta\,\delta_h + 2\,q^2\,\eta\,\Theta\,\delta_h + 4\,q\,\eta^2\,\Theta\,\delta_h + 2\,k\,q^2\,d_h\,\delta_h + 4\,k\,q\,\eta\,d_h\,\delta_h +$$
$$2\,q^2\,\eta\,d_h\,\delta_h + 4\,q\,\eta^2\,d_h\,\delta_h + 4\,k\,q\,\Theta\,d_h\,\delta_h + 2\,q^2\,\Theta\,d_h\,\delta_h + 4\,k\,\eta\,\Theta\,d_h\,\delta_h + 8\,q\,\eta\,\Theta\,d_h\,\delta_h + 4\,\eta^2\,\Theta\,d_h\,\delta_h +$$
$$4\,k\,q\,d_h^2\,\delta_h + 2\,q^2\,d_h^2\,\delta_h + 4\,k\,\eta\,d_h^2\,\delta_h + 8\,q\,\eta\,d_h^2\,\delta_h + 4\,\eta^2\,d_h^2\,\delta_h + 2\,k\,\Theta\,d_h^2\,\delta_h + 4\,q\,\Theta\,d_h^2\,\delta_h +$$
$$6\,\eta\,\Theta\,d_h^2\,\delta_h + 2\,k\,d_h^3\,\delta_h + 4\,q\,d_h^3\,\delta_h + 6\,\eta\,d_h^3\,\delta_h + 2\,\Theta\,d_h^3\,\delta_h + 2\,d_h^4\,\delta_h + 2\,k\,q\,\eta\,\gamma_h\,\delta_h + q^2\,\eta\,\gamma_h\,\delta_h +$$
$$2\,q\,\eta^2\,\gamma_h\,\delta_h + 2\,k\,q\,d_h\,\gamma_h\,\delta_h + q^2\,d_h\,\gamma_h\,\delta_h + 4\,k\,\eta\,d_h\,\gamma_h\,\delta_h + 6\,q\,\eta\,d_h\,\gamma_h\,\delta_h + 4\,\eta^2\,d_h\,\gamma_h\,\delta_h +$$
$$2\,k\,d_h^2\,\gamma_h\,\delta_h + 3\,q\,d_h^2\,\gamma_h\,\delta_h + 6\,\eta\,d_h^2\,\gamma_h\,\delta_h + 2\,d_h^3\,\gamma_h\,\delta_h + k\,q^2\,\delta_h^2 + 2\,k\,q\,\eta\,\delta_h^2 + q^2\,\eta\,\delta_h^2 + 2\,q\,\eta^2\,\delta_h^2 +$$
$$2\,k\,q\,d_h\,\delta_h^2 + q^2\,d_h\,\delta_h^2 + 2\,k\,\eta\,d_h\,\delta_h^2 + 4\,q\,\eta\,d_h\,\delta_h^2 + 2\,\eta^2\,d_h\,\delta_h^2 + k\,d_h^2\,\delta_h^2 + 2\,q\,d_h^2\,\delta_h^2 + 3\,\eta\,d_h^2\,\delta_h^2 + d_h^3\,\delta_h^2$$

In[4]:=
```
P =
 (Λ (d_h^5 + d_h^4 (k + 2 q + 3 η + 2 θ + 2 γ_h + 2 δ_h) + d_h^3 (2 k q + q^2 + 2 k η + 4 q η + 2 η^2 + 2 k θ + 4 q θ + 6 η θ +
          γ_h^2 + 2 (k + 2 q + 3 η + θ) δ_h + δ_h^2 + 2 γ_h (k + 2 q + 3 η + θ + δ_h)) +
     d_h^2 (k q^2 + 2 k q η + q^2 η + 2 q η^2 + 4 k q θ + 2 q^2 θ + 4 k η θ + 8 q η θ + 4 η^2 θ + (k + 2 q + 3 η) γ_h^2 +
          2 (q^2 + 4 q η + 2 η^2 + 2 q θ + 3 η θ + k (2 q + 2 η + θ)) δ_h + (k + 2 q + 3 η) δ_h^2 +
          γ_h (3 k q + 2 q^2 + 4 k η + 8 q η + 4 η^2 + 2 k θ + 4 q θ + 6 η θ + 2 (k + 2 q + 3 η) δ_h)) +
     d_h (2 q (k + η) (q + 2 η) θ + (q^2 + 4 q η + 2 η^2 + k (q + 2 η)) γ_h^2 +
          2 (2 η^2 θ + q^2 (η + θ) + 2 q η (η + 2 θ) + k (q^2 + 2 η θ + 2 q (η + θ))) δ_h +
          (q^2 + 4 q η + 2 η^2 + 2 k (q + η)) δ_h^2 + γ_h (4 η^2 θ + 2 q^2 (η + θ) + 4 q η (η + 2 θ) +
               k (q^2 + 4 η θ + 3 q (η + θ)) + (3 k q + 2 q^2 + 4 k η + 8 q η + 4 η^2) δ_h)) +
     q (η (k + q + 2 η) γ_h^2 + (k + η) (q + 2 η) δ_h (2 θ + δ_h) +
          γ_h ((k + 2 η) (q + 2 η) θ + (2 η (q + 2 η) + k (q + 3 η)) δ_h))))
```

Out[4]=
```
Λ (d_h^5 + d_h^4 (k + 2 q + 3 η + 2 θ + 2 γ_h + 2 δ_h) +
   d_h^3 (2 k q + q^2 + 2 k η + 4 q η + 2 η^2 + 2 k θ + 4 q θ + 6 η θ + γ_h^2 +
      2 (k + 2 q + 3 η + θ) δ_h + δ_h^2 + 2 γ_h (k + 2 q + 3 η + θ + δ_h)) +
   d_h^2 (k q^2 + 2 k q η + q^2 η + 2 q η^2 + 4 k q θ + 2 q^2 θ + 4 k η θ + 8 q η θ + 4 η^2 θ + (k + 2 q + 3 η) γ_h^2 +
      2 (q^2 + 4 q η + 2 η^2 + 2 q θ + 3 η θ + k (2 q + 2 η + θ)) δ_h + (k + 2 q + 3 η) δ_h^2 +
      γ_h (3 k q + 2 q^2 + 4 k η + 8 q η + 4 η^2 + 2 k θ + 4 q θ + 6 η θ + 2 (k + 2 q + 3 η) δ_h)) +
   d_h (2 q (k + η) (q + 2 η) θ + (q^2 + 4 q η + 2 η^2 + k (q + 2 η)) γ_h^2 +
      2 (2 η^2 θ + q^2 (η + θ) + 2 q η (η + 2 θ) + k (q^2 + 2 η θ + 2 q (η + θ))) δ_h +
      (q^2 + 4 q η + 2 η^2 + 2 k (q + η)) δ_h^2 + γ_h (4 η^2 θ + 2 q^2 (η + θ) + 4 q η (η + 2 θ) +
         k (q^2 + 4 η θ + 3 q (η + θ)) + (3 k q + 2 q^2 + 4 k η + 8 q η + 4 η^2) δ_h)) +
   q (η (k + q + 2 η) γ_h^2 + (k + η) (q + 2 η) δ_h (2 θ + δ_h) +
      γ_h ((k + 2 η) (q + 2 η) θ + (2 η (q + 2 η) + k (q + 3 η)) δ_h)))
```

In[1]:=
```
x* = P / (K1 + K2 (λh)*)
```

Out[1]=
$$\frac{P}{K_1 + K_2\ (\lambda_h)^*}$$

In[6]:=
```
nry =
 (Λ (d_h^4 (λh)* + d_h^3 (k + 2 q + 3 η + θ + γ_h + δ_h) (λh)* + d_h^2 (k η θ + (2 k q + q^2 + 2 k η + 4 q η + 2 η^2 + k θ +
          2 q θ + 3 η θ + (k + 2 q + 3 η) γ_h + (k + 2 q + 3 η) δ_h) (λh)*) +
     d_h (2 k η (q + η) θ + (k q^2 + 2 k q η + q^2 η + 2 q η^2 + 2 k q θ + q^2 θ + 2 k η θ + 4 q η θ +
          2 η^2 θ + (q^2 + 4 q η + 2 η^2 + k (q + 2 η)) γ_h + (q^2 + 4 q η + 2 η^2 + 2 k (q + η)) δ_h) (λh)*) +
     q (k η (q + 2 η) θ + (η (k + q + 2 η) γ_h + (k + η) (q + 2 η) (θ + δ_h)) (λh)*)))
```

Out[6]=
```
Λ (d_h^4 (λh)* + d_h^3 (k + 2 q + 3 η + θ + γ_h + δ_h) (λh)* +
   d_h^2 (k η θ + (2 k q + q^2 + 2 k η + 4 q η + 2 η^2 + k θ + 2 q θ +
         3 η θ + (k + 2 q + 3 η) γ_h + (k + 2 q + 3 η) δ_h) (λh)*) +
   d_h (2 k η (q + η) θ + (k q^2 + 2 k q η + q^2 η + 2 q η^2 + 2 k q θ + q^2 θ + 2 k η θ + 4 q η θ +
         2 η^2 θ + (q^2 + 4 q η + 2 η^2 + k (q + 2 η)) γ_h + (q^2 + 4 q η + 2 η^2 + 2 k (q + η)) δ_h) (λh)*) +
   q (k η (q + 2 η) θ + (η (k + q + 2 η) γ_h + (k + η) (q + 2 η) (θ + δ_h)) (λh)*))
```

In[7]:=
```
Q1 = Coefficient[nry, (λh)*, 0]
```

Out[7]=
$$\Lambda \left(k\, q^2\, \eta\, \Theta + 2\, k\, q\, \eta^2\, \Theta + 2\, k\, q\, \eta\, \Theta\, d_h + 2\, k\, \eta^2\, \Theta\, d_h + k\, \eta\, \Theta\, d_h^2\right)$$

In[8]:=
```
Q2 = Coefficient[nry, (λh)*, 1]
```

Out[8]=
$$\begin{aligned}\Lambda \Big(&k\, q^2\, \Theta + 2\, k\, q\, \eta\, \Theta + q^2\, \eta\, \Theta + 2\, q\, \eta^2\, \Theta + k\, q^2\, d_h + 2\, k\, q\, \eta\, d_h + q^2\, \eta\, d_h + 2\, q\, \eta^2\, d_h + \\ &2\, k\, q\, \Theta\, d_h + q^2\, \Theta\, d_h + 2\, k\, \eta\, \Theta\, d_h + 4\, q\, \eta\, \Theta\, d_h + 2\, \eta^2\, \Theta\, d_h + 2\, k\, q\, d_h^2 + q^2\, d_h^2 + 2\, k\, \eta\, d_h^2 + \\ &4\, q\, \eta\, d_h^2 + 2\, \eta^2\, d_h^2 + k\, \Theta\, d_h^2 + 2\, q\, \Theta\, d_h^2 + 3\, \eta\, \Theta\, d_h^2 + k\, d_h^3 + 2\, q\, d_h^3 + 3\, \eta\, d_h^3 + \Theta\, d_h^3 + d_h^4 + k\, q\, \eta\, \gamma_h + \\ &q^2\, \eta\, \gamma_h + 2\, q\, \eta^2\, \gamma_h + k\, q\, d_h\, \gamma_h + q^2\, d_h\, \gamma_h + 2\, k\, \eta\, d_h\, \gamma_h + 4\, q\, \eta\, d_h\, \gamma_h + 2\, \eta^2\, d_h\, \gamma_h + k\, d_h^2\, \gamma_h + \\ &2\, q\, d_h^2\, \gamma_h + 3\, \eta\, d_h^2\, \gamma_h + d_h^3\, \gamma_h + k\, q^2\, \delta_h + 2\, k\, q\, \eta\, \delta_h + q^2\, \eta\, \delta_h + 2\, q\, \eta^2\, \delta_h + 2\, k\, q\, d_h\, \delta_h + \\ &q^2\, d_h\, \delta_h + 2\, k\, \eta\, d_h\, \delta_h + 4\, q\, \eta\, d_h\, \delta_h + 2\, \eta^2\, d_h\, \delta_h + k\, d_h^2\, \delta_h + 2\, q\, d_h^2\, \delta_h + 3\, \eta\, d_h^2\, \delta_h + d_h^3\, \delta_h\Big)\end{aligned}$$

In[2]:=
```
y* = (Q1 + Q2 (λh)*) / ((K1 + K2 (λh)*))
```

Out[2]=
$$\frac{Q_1 + Q_2\ (\lambda_h)^*}{K_1 + K_2\ (\lambda_h)^*}$$

In[9]:=
```
nrz =
 (Λ γh (k q η Θ + 2 k η^2 Θ + k η^2 δh + k q Θ (λh)* + 2 k η Θ (λh)* + q η Θ (λh)* + 2 η^2 Θ (λh)* + dh^3 (λh)* +
     k q δh (λh)* + k η δh (λh)* + q η δh (λh)* + η^2 δh (λh)* +
     dh^2 (k + q + 2 η + Θ + γh + δh) (λh)* + η γh (k η + (k + q + η) (λh)*) + dh (k η (η + Θ) +
        (k q + k η + q η + η^2 + k Θ + q Θ + 3 η Θ + (k + q + 2 η) γh + (k + q + 2 η) δh) (λh)*)))
```

Out[9]=
$$\begin{aligned}\Lambda\, \gamma_h \Big(&k\, q\, \eta\, \Theta + 2\, k\, \eta^2\, \Theta + k\, \eta^2\, \delta_h + k\, q\, \Theta\ (\lambda_h)^* + 2\, k\, \eta\, \Theta\ (\lambda_h)^* + \\ &q\, \eta\, \Theta\ (\lambda_h)^* + 2\, \eta^2\, \Theta\ (\lambda_h)^* + d_h^3\ (\lambda_h)^* + k\, q\, \delta_h\ (\lambda_h)^* + k\, \eta\, \delta_h\ (\lambda_h)^* + q\, \eta\, \delta_h\ (\lambda_h)^* + \\ &\eta^2\, \delta_h\ (\lambda_h)^* + d_h^2\ (k + q + 2\, \eta + \Theta + \gamma_h + \delta_h)\ (\lambda_h)^* + \eta\, \gamma_h\ (k\, \eta + (k + q + \eta)\ (\lambda_h)^*) + \\ &d_h\ \left(k\, \eta\ (\eta + \Theta) + \left(k\, q + k\, \eta + q\, \eta + \eta^2 + k\, \Theta + q\, \Theta + 3\, \eta\, \Theta + (k + q + 2\, \eta)\ \gamma_h + (k + q + 2\, \eta)\ \delta_h\right)\ (\lambda_h)^*\right)\Big)\end{aligned}$$

In[10]:=
```
Q3 = Coefficient[nrz, (λh)*, 0]
```

Out[10]=
$$\Lambda\, \gamma_h \left(k\, q\, \eta\, \Theta + 2\, k\, \eta^2\, \Theta + k\, \eta^2\, d_h + k\, \eta\, \Theta\, d_h + k\, \eta^2\, \gamma_h + k\, \eta^2\, \delta_h\right)$$

In[11]:=
```
Q4 = Coefficient[nrz, (λh)*, 1]
```

Out[11]=
$$\begin{aligned}\Lambda\, \gamma_h \Big(&k\, q\, \Theta + 2\, k\, \eta\, \Theta + q\, \eta\, \Theta + 2\, \eta^2\, \Theta + k\, q\, d_h + k\, \eta\, d_h + q\, \eta\, d_h + \eta^2\, d_h + k\, \Theta\, d_h + q\, \Theta\, d_h + \\ &3\, \eta\, \Theta\, d_h + k\, d_h^2 + q\, d_h^2 + 2\, \eta\, d_h^2 + \Theta\, d_h^2 + d_h^3 + k\, \eta\, \gamma_h + q\, \eta\, \gamma_h + \eta^2\, \gamma_h + k\, d_h\, \gamma_h + q\, d_h\, \gamma_h + \\ &2\, \eta\, d_h\, \gamma_h + d_h^2\, \gamma_h + k\, q\, \delta_h + k\, \eta\, \delta_h + q\, \eta\, \delta_h + \eta^2\, \delta_h + k\, d_h\, \delta_h + q\, d_h\, \delta_h + 2\, \eta\, d_h\, \delta_h + d_h^2\, \delta_h\Big)\end{aligned}$$

In[5]:=
```
z* = (Q3 + Q4 (λh)*) / ((K1 + K2 (λh)*))
```

Out[5]=
$$\frac{Q_3 + Q_4\ (\lambda_h)^*}{K_1 + K_2\ (\lambda_h)^*}$$

In[8]:=
```
Nhh* = x* + y* + z*
```

Out[8]=
$$\frac{P}{K_1 + K_2\ (\lambda_h)^*} + \frac{Q_1 + Q_2\ (\lambda_h)^*}{K_1 + K_2\ (\lambda_h)^*} + \frac{Q_3 + Q_4\ (\lambda_h)^*}{K_1 + K_2\ (\lambda_h)^*}$$

In[2]:=
```
Nhh* = (P + Q1 + Q3 + Q2 (λh)* + Q4 (λh)*) / (K1 + K2 (λh)*)
```

Out[2]=
$$\frac{P + Q_1 + Q_3 + Q_2\ (\lambda_h)^* + Q_4\ (\lambda_h)^*}{K_1 + K_2\ (\lambda_h)^*}$$

In[10]:=
$$\lambda_v^* = \beta_v\ \frac{(y^* + r * z^*)}{N_{hh}^*}$$

In[11]:=
$$\text{Simplify}\left[\left(\beta_v\ (K_1 + K_2\ (\lambda_h)^*)\ \left(\frac{Q_1 + Q_2\ (\lambda_h)^*}{K_1 + K_2\ (\lambda_h)^*} + \frac{r\ (Q_3 + Q_4\ (\lambda_h)^*)}{K_1 + K_2\ (\lambda_h)^*}\right)\right) \Big/ (P + Q_1 + Q_3 + Q_2\ (\lambda_h)^* + Q_4\ (\lambda_h)^*)\right]$$

In[12]:=
$$\lambda_v^* = \frac{\beta_v\ (Q_1 + r\ Q_3 + (Q_2 + r\ Q_4)\ (\lambda_h)^*)}{P + Q_1 + Q_3 + Q_2\ (\lambda_h)^* + Q_4\ (\lambda_h)^*}$$

Out[12]=
$$\frac{\beta_v\ (Q_1 + r\ Q_3 + (Q_2 + r\ Q_4)\ (\lambda_h)^*)}{P + Q_1 + Q_3 + Q_2\ (\lambda_h)^* + Q_4\ (\lambda_h)^*}$$

In[13]:=
$$m^* = \frac{\sigma\ \phi\ (\lambda_v)^*}{dv\ (\sigma + d_v)\ (dv + (\lambda_v)^*)}$$

In[14]:=
$$\text{Simplify}\left[(\sigma\ \phi\ \beta_v\ (Q_1 + r\ Q_3 + (Q_2 + r\ Q_4)\ (\lambda_h)^*)) \Big/ \left(dv\ (\sigma + d_v)\ (P + Q_1 + Q_3 + Q_2\ (\lambda_h)^* + Q_4\ (\lambda_h)^*)\ \left(dv + \frac{\beta_v\ (Q_1 + r\ Q_3 + (Q_2 + r\ Q_4)\ (\lambda_h)^*)}{P + Q_1 + Q_3 + Q_2\ (\lambda_h)^* + Q_4\ (\lambda_h)^*}\right)\right)\right]$$

In[1]:=
$$m^* = (\sigma\ \phi\ \beta_v\ (Q_1 + r\ Q_3 + (Q_2 + r\ Q_4)\ (\lambda_h)^*)) / (dv\ (\sigma + d_v)\ (dv\ P + Q_1\ (dv + \beta_v) + Q_3\ (dv + r\ \beta_v) + dv\ Q_2\ (\lambda_h)^* + dv\ Q_4\ (\lambda_h)^* + Q_2\ \beta_v\ (\lambda_h)^* + r\ Q_4\ \beta_v\ (\lambda_h)^*))$$

Out[1]=
$$(\sigma\ \phi\ \beta_v\ (Q_1 + r\ Q_3 + (Q_2 + r\ Q_4)\ (\lambda_h)^*)) / (dv\ (\sigma + d_v)\ (dv\ P + Q_1\ (dv + \beta_v) + Q_3\ (dv + r\ \beta_v) + dv\ Q_2\ (\lambda_h)^* + dv\ Q_4\ (\lambda_h)^* + Q_2\ \beta_v\ (\lambda_h)^* + r\ Q_4\ \beta_v\ (\lambda_h)^*))$$

$$(\lambda_h)^* = \beta_h\ ((\sigma\ \phi\ \beta_v\ (Q_1 + r\ Q_3 + (Q_2 + r\ Q_4)\ (\lambda_h)^*)\ (K_1 + K_2\ (\lambda_h)^*)) / (dv\ (\sigma + d_v)\ (dv\ P + Q_1\ (dv + \beta_v) + Q_3\ (dv + r\ \beta_v) + dv\ Q_2\ (\lambda_h)^* + dv\ Q_4\ (\lambda_h)^* + Q_2\ \beta_v\ (\lambda_h)^* + r\ Q_4\ \beta_v\ (\lambda_h)^*)\ (P + Q_1 + Q_3 + Q_2\ (\lambda_h)^* + Q_4\ (\lambda_h)^*)))$$

$$\text{Expand}[d_v\ (\sigma + d_v)\ (d_v\ P + Q_1\ (d_v + \beta_v) + Q_3\ (d_v + r\ \beta_v) + d_v\ Q_2\ (\lambda_h)^* + d_v\ Q_4\ (\lambda_h)^* + Q_2\ \beta_v\ (\lambda_h)^* + r\ Q_4\ \beta_v\ (\lambda_h)^*)\ (P + Q_1 + Q_3 + Q_2\ (\lambda_h)^* + Q_4\ (\lambda_h)^*)\ (\lambda_h)^* - \sigma\ \phi\ \beta_v\ (Q_1 + r\ Q_3 + (Q_2 + r\ Q_4)\ (\lambda_h)^*)\ (K_1 + K_2\ (\lambda_h)^*)]$$

In[2]:=
$$\begin{aligned}\text{poly} = {} & -\sigma\,\phi\,K_1\,Q_1\,\beta_v - r\,\sigma\,\phi\,K_1\,Q_3\,\beta_v + P^2\,\sigma\,d_v^2\,(\lambda_h)^* + P^2\,d_v^3\,(\lambda_h)^* + 2\,P\,\sigma\,d_v^2\,Q_1\,(\lambda_h)^* + 2\,P\,d_v^3\,Q_1\,(\lambda_h)^* + \\ & \sigma\,d_v^2\,Q_1^2\,(\lambda_h)^* + d_v^3\,Q_1^2\,(\lambda_h)^* + 2\,P\,\sigma\,d_v^2\,Q_3\,(\lambda_h)^* + 2\,P\,d_v^3\,Q_3\,(\lambda_h)^* + 2\,\sigma\,d_v^2\,Q_1\,Q_3\,(\lambda_h)^* + \\ & 2\,d_v^3\,Q_1\,Q_3\,(\lambda_h)^* + \sigma\,d_v^2\,Q_3^2\,(\lambda_h)^* + d_v^3\,Q_3^2\,(\lambda_h)^* + P\,\sigma\,d_v\,Q_1\,\beta_v\,(\lambda_h)^* + P\,d_v^2\,Q_1\,\beta_v\,(\lambda_h)^* - \\ & \sigma\,\phi\,K_2\,Q_1\,\beta_v\,(\lambda_h)^* + \sigma\,d_v\,Q_1^2\,\beta_v\,(\lambda_h)^* + d_v^2\,Q_1^2\,\beta_v\,(\lambda_h)^* - \sigma\,\phi\,K_1\,Q_2\,\beta_v\,(\lambda_h)^* + P\,r\,\sigma\,d_v\,Q_3\,\beta_v\,(\lambda_h)^* + \\ & P\,r\,d_v^2\,Q_3\,\beta_v\,(\lambda_h)^* - r\,\sigma\,\phi\,K_2\,Q_3\,\beta_v\,(\lambda_h)^* + \sigma\,d_v\,Q_1\,Q_3\,\beta_v\,(\lambda_h)^* + r\,\sigma\,d_v\,Q_1\,Q_3\,\beta_v\,(\lambda_h)^* + \\ & d_v^2\,Q_1\,Q_3\,\beta_v\,(\lambda_h)^* + r\,d_v^2\,Q_1\,Q_3\,\beta_v\,(\lambda_h)^* + r\,\sigma\,d_v\,Q_3^2\,\beta_v\,(\lambda_h)^* + r\,d_v^2\,Q_3^2\,\beta_v\,(\lambda_h)^* - r\,\sigma\,\phi\,K_1\,Q_4\,\beta_v\,(\lambda_h)^* + \\ & 2\,P\,\sigma\,d_v^2\,Q_2\,((\lambda_h)^*)^2 + 2\,P\,d_v^3\,Q_2\,((\lambda_h)^*)^2 + 2\,\sigma\,d_v^2\,Q_1\,Q_2\,((\lambda_h)^*)^2 + 2\,d_v^3\,Q_1\,Q_2\,((\lambda_h)^*)^2 + \\ & 2\,\sigma\,d_v^2\,Q_2\,Q_3\,((\lambda_h)^*)^2 + 2\,d_v^3\,Q_2\,Q_3\,((\lambda_h)^*)^2 + 2\,P\,\sigma\,d_v^2\,Q_4\,((\lambda_h)^*)^2 + 2\,P\,d_v^3\,Q_4\,((\lambda_h)^*)^2 + \\ & 2\,\sigma\,d_v^2\,Q_1\,Q_4\,((\lambda_h)^*)^2 + 2\,d_v^3\,Q_1\,Q_4\,((\lambda_h)^*)^2 + 2\,\sigma\,d_v^2\,Q_3\,Q_4\,((\lambda_h)^*)^2 + 2\,d_v^3\,Q_3\,Q_4\,((\lambda_h)^*)^2 + \\ & P\,\sigma\,d_v\,Q_2\,\beta_v\,((\lambda_h)^*)^2 + P\,d_v^2\,Q_2\,\beta_v\,((\lambda_h)^*)^2 - \sigma\,\phi\,K_2\,Q_2\,\beta_v\,((\lambda_h)^*)^2 + 2\,\sigma\,d_v\,Q_1\,Q_2\,\beta_v\,((\lambda_h)^*)^2 + \\ & 2\,d_v^2\,Q_1\,Q_2\,\beta_v\,((\lambda_h)^*)^2 + \sigma\,d_v\,Q_2\,Q_3\,\beta_v\,((\lambda_h)^*)^2 + r\,\sigma\,d_v\,Q_2\,Q_3\,\beta_v\,((\lambda_h)^*)^2 + d_v^2\,Q_2\,Q_3\,\beta_v\,((\lambda_h)^*)^2 + \\ & r\,d_v^2\,Q_2\,Q_3\,\beta_v\,((\lambda_h)^*)^2 + P\,r\,\sigma\,d_v\,Q_4\,\beta_v\,((\lambda_h)^*)^2 + P\,r\,d_v^2\,Q_4\,\beta_v\,((\lambda_h)^*)^2 - r\,\sigma\,\phi\,K_2\,Q_4\,\beta_v\,((\lambda_h)^*)^2 + \\ & \sigma\,d_v\,Q_1\,Q_4\,\beta_v\,((\lambda_h)^*)^2 + r\,\sigma\,d_v\,Q_1\,Q_4\,\beta_v\,((\lambda_h)^*)^2 + d_v^2\,Q_1\,Q_4\,\beta_v\,((\lambda_h)^*)^2 + r\,d_v^2\,Q_1\,Q_4\,\beta_v\,((\lambda_h)^*)^2 + \\ & 2\,r\,\sigma\,d_v\,Q_3\,Q_4\,\beta_v\,((\lambda_h)^*)^2 + 2\,r\,d_v^2\,Q_3\,Q_4\,\beta_v\,((\lambda_h)^*)^2 + \sigma\,d_v^2\,Q_2^2\,((\lambda_h)^*)^3 + d_v^3\,Q_2^2\,((\lambda_h)^*)^3 + \\ & 2\,\sigma\,d_v^2\,Q_2\,Q_4\,((\lambda_h)^*)^3 + 2\,d_v^3\,Q_2\,Q_4\,((\lambda_h)^*)^3 + \sigma\,d_v^2\,Q_4^2\,((\lambda_h)^*)^3 + d_v^3\,Q_4^2\,((\lambda_h)^*)^3 + \\ & \sigma\,d_v\,Q_2^2\,\beta_v\,((\lambda_h)^*)^3 + d_v^2\,Q_2^2\,\beta_v\,((\lambda_h)^*)^3 + \sigma\,d_v\,Q_2\,Q_4\,\beta_v\,((\lambda_h)^*)^3 + r\,\sigma\,d_v\,Q_2\,Q_4\,\beta_v\,((\lambda_h)^*)^3 + \\ & d_v^2\,Q_2\,Q_4\,\beta_v\,((\lambda_h)^*)^3 + r\,d_v^2\,Q_2\,Q_4\,\beta_v\,((\lambda_h)^*)^3 + r\,\sigma\,d_v\,Q_4^2\,\beta_v\,((\lambda_h)^*)^3 + r\,d_v^2\,Q_4^2\,\beta_v\,((\lambda_h)^*)^3\end{aligned}$$

Out[2]=
$$\begin{aligned}& -\sigma\,\phi\,K_1\,Q_1\,\beta_v - r\,\sigma\,\phi\,K_1\,Q_3\,\beta_v + P^2\,\sigma\,d_v^2\,(\lambda_h)^* + P^2\,d_v^3\,(\lambda_h)^* + 2\,P\,\sigma\,d_v^2\,Q_1\,(\lambda_h)^* + 2\,P\,d_v^3\,Q_1\,(\lambda_h)^* + \\ & \sigma\,d_v^2\,Q_1^2\,(\lambda_h)^* + d_v^3\,Q_1^2\,(\lambda_h)^* + 2\,P\,\sigma\,d_v^2\,Q_3\,(\lambda_h)^* + 2\,P\,d_v^3\,Q_3\,(\lambda_h)^* + 2\,\sigma\,d_v^2\,Q_1\,Q_3\,(\lambda_h)^* + \\ & 2\,d_v^3\,Q_1\,Q_3\,(\lambda_h)^* + \sigma\,d_v^2\,Q_3^2\,(\lambda_h)^* + d_v^3\,Q_3^2\,(\lambda_h)^* + P\,\sigma\,d_v\,Q_1\,\beta_v\,(\lambda_h)^* + P\,d_v^2\,Q_1\,\beta_v\,(\lambda_h)^* - \\ & \sigma\,\phi\,K_2\,Q_1\,\beta_v\,(\lambda_h)^* + \sigma\,d_v\,Q_1^2\,\beta_v\,(\lambda_h)^* + d_v^2\,Q_1^2\,\beta_v\,(\lambda_h)^* - \sigma\,\phi\,K_1\,Q_2\,\beta_v\,(\lambda_h)^* + P\,r\,\sigma\,d_v\,Q_3\,\beta_v\,(\lambda_h)^* + \\ & P\,r\,d_v^2\,Q_3\,\beta_v\,(\lambda_h)^* - r\,\sigma\,\phi\,K_2\,Q_3\,\beta_v\,(\lambda_h)^* + \sigma\,d_v\,Q_1\,Q_3\,\beta_v\,(\lambda_h)^* + r\,\sigma\,d_v\,Q_1\,Q_3\,\beta_v\,(\lambda_h)^* + \\ & d_v^2\,Q_1\,Q_3\,\beta_v\,(\lambda_h)^* + r\,d_v^2\,Q_1\,Q_3\,\beta_v\,(\lambda_h)^* + r\,\sigma\,d_v\,Q_3^2\,\beta_v\,(\lambda_h)^* + r\,d_v^2\,Q_3^2\,\beta_v\,(\lambda_h)^* - r\,\sigma\,\phi\,K_1\,Q_4\,\beta_v\,(\lambda_h)^* + \\ & 2\,P\,\sigma\,d_v^2\,Q_2\,((\lambda_h)^*)^2 + 2\,P\,d_v^3\,Q_2\,((\lambda_h)^*)^2 + 2\,\sigma\,d_v^2\,Q_1\,Q_2\,((\lambda_h)^*)^2 + 2\,d_v^3\,Q_1\,Q_2\,((\lambda_h)^*)^2 + \\ & 2\,\sigma\,d_v^2\,Q_2\,Q_3\,((\lambda_h)^*)^2 + 2\,d_v^3\,Q_2\,Q_3\,((\lambda_h)^*)^2 + 2\,P\,\sigma\,d_v^2\,Q_4\,((\lambda_h)^*)^2 + 2\,P\,d_v^3\,Q_4\,((\lambda_h)^*)^2 + \\ & 2\,\sigma\,d_v^2\,Q_1\,Q_4\,((\lambda_h)^*)^2 + 2\,d_v^3\,Q_1\,Q_4\,((\lambda_h)^*)^2 + 2\,\sigma\,d_v^2\,Q_3\,Q_4\,((\lambda_h)^*)^2 + 2\,d_v^3\,Q_3\,Q_4\,((\lambda_h)^*)^2 + \\ & P\,\sigma\,d_v\,Q_2\,\beta_v\,((\lambda_h)^*)^2 + P\,d_v^2\,Q_2\,\beta_v\,((\lambda_h)^*)^2 - \sigma\,\phi\,K_2\,Q_2\,\beta_v\,((\lambda_h)^*)^2 + 2\,\sigma\,d_v\,Q_1\,Q_2\,\beta_v\,((\lambda_h)^*)^2 + \\ & 2\,d_v^2\,Q_1\,Q_2\,\beta_v\,((\lambda_h)^*)^2 + \sigma\,d_v\,Q_2\,Q_3\,\beta_v\,((\lambda_h)^*)^2 + r\,\sigma\,d_v\,Q_2\,Q_3\,\beta_v\,((\lambda_h)^*)^2 + d_v^2\,Q_2\,Q_3\,\beta_v\,((\lambda_h)^*)^2 + \\ & r\,d_v^2\,Q_2\,Q_3\,\beta_v\,((\lambda_h)^*)^2 + P\,r\,\sigma\,d_v\,Q_4\,\beta_v\,((\lambda_h)^*)^2 + P\,r\,d_v^2\,Q_4\,\beta_v\,((\lambda_h)^*)^2 - r\,\sigma\,\phi\,K_2\,Q_4\,\beta_v\,((\lambda_h)^*)^2 + \\ & \sigma\,d_v\,Q_1\,Q_4\,\beta_v\,((\lambda_h)^*)^2 + r\,\sigma\,d_v\,Q_1\,Q_4\,\beta_v\,((\lambda_h)^*)^2 + d_v^2\,Q_1\,Q_4\,\beta_v\,((\lambda_h)^*)^2 + r\,d_v^2\,Q_1\,Q_4\,\beta_v\,((\lambda_h)^*)^2 + \\ & 2\,r\,\sigma\,d_v\,Q_3\,Q_4\,\beta_v\,((\lambda_h)^*)^2 + 2\,r\,d_v^2\,Q_3\,Q_4\,\beta_v\,((\lambda_h)^*)^2 + \sigma\,d_v^2\,Q_2^2\,((\lambda_h)^*)^3 + d_v^3\,Q_2^2\,((\lambda_h)^*)^3 + \\ & 2\,\sigma\,d_v^2\,Q_2\,Q_4\,((\lambda_h)^*)^3 + 2\,d_v^3\,Q_2\,Q_4\,((\lambda_h)^*)^3 + \sigma\,d_v^2\,Q_4^2\,((\lambda_h)^*)^3 + d_v^3\,Q_4^2\,((\lambda_h)^*)^3 + \\ & \sigma\,d_v\,Q_2^2\,\beta_v\,((\lambda_h)^*)^3 + d_v^2\,Q_2^2\,\beta_v\,((\lambda_h)^*)^3 + \sigma\,d_v\,Q_2\,Q_4\,\beta_v\,((\lambda_h)^*)^3 + r\,\sigma\,d_v\,Q_2\,Q_4\,\beta_v\,((\lambda_h)^*)^3 + \\ & d_v^2\,Q_2\,Q_4\,\beta_v\,((\lambda_h)^*)^3 + r\,d_v^2\,Q_2\,Q_4\,\beta_v\,((\lambda_h)^*)^3 + r\,\sigma\,d_v\,Q_4^2\,\beta_v\,((\lambda_h)^*)^3 + r\,d_v^2\,Q_4^2\,\beta_v\,((\lambda_h)^*)^3\end{aligned}$$

In[3]:=
$$a_0 = \text{Coefficient}[\text{poly}, (\lambda_h)^*, 3]$$

Out[3]=
$$\begin{aligned}& \sigma\,d_v^2\,Q_2^2 + d_v^3\,Q_2^2 + 2\,\sigma\,d_v^2\,Q_2\,Q_4 + 2\,d_v^3\,Q_2\,Q_4 + \sigma\,d_v^2\,Q_4^2 + d_v^3\,Q_4^2 + \sigma\,d_v\,Q_2^2\,\beta_v + d_v^2\,Q_2^2\,\beta_v + \\ & \sigma\,d_v\,Q_2\,Q_4\,\beta_v + r\,\sigma\,d_v\,Q_2\,Q_4\,\beta_v + d_v^2\,Q_2\,Q_4\,\beta_v + r\,d_v^2\,Q_2\,Q_4\,\beta_v + r\,\sigma\,d_v\,Q_4^2\,\beta_v + r\,d_v^2\,Q_4^2\,\beta_v\end{aligned}$$

In[4]:= **a_1 = Coefficient[poly, $(\lambda_h)^*$, 2]**

Out[4]= $2\,P\,\sigma\,d_v^2\,Q_2 + 2\,P\,d_v^3\,Q_2 + 2\,\sigma\,d_v^2\,Q_1\,Q_2 + 2\,d_v^3\,Q_1\,Q_2 + 2\,\sigma\,d_v^2\,Q_2\,Q_3 + 2\,d_v^3\,Q_2\,Q_3 +$
$2\,P\,\sigma\,d_v^2\,Q_4 + 2\,P\,d_v^3\,Q_4 + 2\,\sigma\,d_v^2\,Q_1\,Q_4 + 2\,d_v^3\,Q_1\,Q_4 + 2\,\sigma\,d_v^2\,Q_3\,Q_4 + 2\,d_v^3\,Q_3\,Q_4 + P\,\sigma\,d_v\,Q_2\,\beta_v +$
$P\,d_v^2\,Q_2\,\beta_v - \sigma\,\phi\,K_2\,Q_2\,\beta_v + 2\,\sigma\,d_v\,Q_1\,Q_2\,\beta_v + 2\,d_v^2\,Q_1\,Q_2\,\beta_v + \sigma\,d_v\,Q_2\,Q_3\,\beta_v + r\,\sigma\,d_v\,Q_2\,Q_3\,\beta_v +$
$d_v^2\,Q_2\,Q_3\,\beta_v + r\,d_v^2\,Q_2\,Q_3\,\beta_v + P\,r\,\sigma\,d_v\,Q_4\,\beta_v + P\,r\,d_v^2\,Q_4\,\beta_v - r\,\sigma\,\phi\,K_2\,Q_4\,\beta_v + \sigma\,d_v\,Q_1\,Q_4\,\beta_v +$
$r\,\sigma\,d_v\,Q_1\,Q_4\,\beta_v + d_v^2\,Q_1\,Q_4\,\beta_v + r\,d_v^2\,Q_1\,Q_4\,\beta_v + 2\,r\,\sigma\,d_v\,Q_3\,Q_4\,\beta_v + 2\,r\,d_v^2\,Q_3\,Q_4\,\beta_v$

In[5]:= **a_2 = Coefficient[poly, $(\lambda_h)^*$, 1]**

Out[5]= $P^2\,\sigma\,d_v^2 + P^2\,d_v^3 + 2\,P\,\sigma\,d_v^2\,Q_1 + 2\,P\,d_v^3\,Q_1 + \sigma\,d_v^2\,Q_1^2 + d_v^3\,Q_1^2 + 2\,P\,\sigma\,d_v^2\,Q_3 + 2\,P\,d_v^3\,Q_3 +$
$2\,\sigma\,d_v^2\,Q_1\,Q_3 + 2\,d_v^3\,Q_1\,Q_3 + \sigma\,d_v^2\,Q_3^2 + d_v^3\,Q_3^2 + P\,\sigma\,d_v\,Q_1\,\beta_v + P\,d_v^2\,Q_1\,\beta_v - \sigma\,\phi\,K_2\,Q_1\,\beta_v + \sigma\,d_v\,Q_1^2\,\beta_v +$
$d_v^2\,Q_1^2\,\beta_v - \sigma\,\phi\,K_1\,Q_2\,\beta_v + P\,r\,\sigma\,d_v\,Q_3\,\beta_v + P\,r\,d_v^2\,Q_3\,\beta_v - r\,\sigma\,\phi\,K_2\,Q_3\,\beta_v + \sigma\,d_v\,Q_1\,Q_3\,\beta_v +$
$r\,\sigma\,d_v\,Q_1\,Q_3\,\beta_v + d_v^2\,Q_1\,Q_3\,\beta_v + r\,d_v^2\,Q_1\,Q_3\,\beta_v + r\,\sigma\,d_v\,Q_3^2\,\beta_v + r\,d_v^2\,Q_3^2\,\beta_v - r\,\sigma\,\phi\,K_1\,Q_4\,\beta_v$

In[6]:= **a_3 = Coefficient[poly, $(\lambda_h)^*$, 0]**

Out[6]= $-\sigma\,\phi\,K_1\,Q_1\,\beta_v - r\,\sigma\,\phi\,K_1\,Q_3\,\beta_v$

$a_0\,((\lambda_h)^*)^3 + a_1\,((\lambda_h)^*)^2 + a_2\,(\lambda_h)^* + a_3 == 0$,
where $a_3 < 0$ and can be zero when either $k = 0$ or $\theta = 0$ and $\eta = 0$ or only $\theta = 0$