$$
\begin{bmatrix} \hat{\zeta}_1 \\ \hat{\lambda}_1 \\ \hat{\zeta}_2 \\ \hat{\lambda}_2 \\ \vdots \\ \hat{\zeta}_n \\ \hat{\lambda}_n \\ \hat{\theta}_1 \\ \hat{\theta}_2 \\ \vdots \\ \hat{\theta}_N \end{bmatrix}_{t+1}
=
\begin{bmatrix} \hat{\zeta}_1 \\ \hat{\lambda}_1 \\ \hat{\zeta}_2 \\ \hat{\lambda}_2 \\ \vdots \\ \hat{\zeta}_n \\ \hat{\lambda}_n \\ \hat{\theta}_1 \\ \hat{\theta}_2 \\ \vdots \\ \hat{\theta}_N \end{bmatrix}_{t}
-
\begin{bmatrix}
\frac{\partial^2 L}{\partial \zeta_1^2} & \frac{\partial^2 L}{\partial \zeta_1 \partial \lambda_1} & \frac{\partial^2 L}{\partial \zeta_1 \partial \zeta_2} & \frac{\partial^2 L}{\partial \zeta_1 \partial \lambda_2} & \cdots & \frac{\partial^2 L}{\partial \zeta_1 \partial \zeta_n} & \frac{\partial^2 L}{\partial \zeta_1 \partial \lambda_n} & \frac{\partial^2 L}{\partial \zeta_1 \partial \theta_1} & \frac{\partial^2 L}{\partial \zeta_1 \partial \theta_2} & \cdots & \frac{\partial^2 L}{\partial \lambda_1 \partial \theta_N} \\
\frac{\partial^2 L}{\partial \lambda_1 \partial \zeta_1} & \frac{\partial^2 L}{\partial \lambda_1^2} & \frac{\partial^2 L}{\partial \lambda_1 \partial \zeta_2} & \frac{\partial^2 L}{\partial \lambda_1 \partial \lambda_2} & \cdots & \frac{\partial^2 L}{\partial \lambda_1 \partial \zeta_n} & \frac{\partial^2 L}{\partial \lambda_1 \partial \lambda_n} & \frac{\partial^2 L}{\partial \lambda_1 \partial \theta_1} & \frac{\partial^2 L}{\partial \lambda_1 \partial \theta_2} & \cdots & \frac{\partial^2 L}{\partial \lambda_1 \partial \theta_N} \\
\frac{\partial^2 L}{\partial \zeta_2 \zeta_1} & \frac{\partial^2 L}{\partial \zeta_2 \partial \lambda_1} & \frac{\partial^2 L}{\partial \zeta_2^2} & \frac{\partial^2 L}{\partial \zeta_2 \partial \lambda_2} & \cdots & \frac{\partial^2 L}{\partial \zeta_2 \partial \zeta_n} & \frac{\partial^2 L}{\partial \zeta_2 \partial \lambda_n} & \frac{\partial^2 L}{\partial \zeta_2 \partial \theta_1} & \frac{\partial^2 L}{\partial \zeta_2 \partial \theta_2} & \cdots & \frac{\partial^2 L}{\partial \lambda_2 \partial \theta_N} \\
\frac{\partial^2 L}{\partial \lambda_2 \partial \zeta_1} & \frac{\partial^2 L}{\partial \lambda_2 \partial \lambda_1} & \frac{\partial^2 L}{\partial \lambda_2 \partial \zeta_2} & \frac{\partial^2 L}{\partial \lambda_2^2} & \cdots & \frac{\partial^2 L}{\partial \lambda_2 \partial \zeta_n} & \frac{\partial^2 L}{\partial \lambda_2 \partial \lambda_n} & \frac{\partial^2 L}{\partial \lambda_2 \partial \theta_1} & \frac{\partial^2 L}{\partial \lambda_2 \partial \theta_2} & \cdots & \frac{\partial^2 L}{\partial \lambda_2 \partial \theta_N} \\
\vdots & \vdots & \vdots & \vdots & \ddots & \vdots & \vdots & \vdots & \vdots & \vdots & \vdots \\
\frac{\partial^2 L}{\partial \zeta_n \partial \zeta_1} & \frac{\partial^2 L}{\partial \zeta_n \partial \lambda_1} & \frac{\partial^2 L}{\partial \zeta_n \partial \zeta_2} & \frac{\partial^2 L}{\partial \zeta_n \partial \lambda_2} & \cdots & \frac{\partial^2 L}{\partial \zeta_n^2} & \frac{\partial^2 L}{\partial \zeta_n \partial \lambda_n} & \frac{\partial^2 L}{\partial \zeta_n \partial \theta_1} & \frac{\partial^2 L}{\partial \zeta_n \partial \theta_2} & \cdots & \frac{\partial^2 L}{\partial \lambda_n \partial \theta_N} \\
\frac{\partial^2 L}{\partial \lambda_n \partial \zeta_1} & \frac{\partial^2 L}{\partial \lambda_n \partial \lambda_1} & \frac{\partial^2 L}{\partial \lambda_n \partial \zeta_2} & \frac{\partial^2 L}{\partial \lambda_n \partial \lambda_2} & \cdots & \frac{\partial^2 L}{\partial \lambda_n \partial \zeta_n} & \frac{\partial^2 L}{\partial \lambda_n^2} & \frac{\partial^2 L}{\partial \lambda_n \partial \theta_1} & \frac{\partial^2 L}{\partial \lambda_n \partial \theta_2} & \cdots & \frac{\partial^2 L}{\partial \lambda_n \partial \theta_N} \\
\frac{\partial^2 L}{\partial \theta_1 \partial \zeta_1} & \frac{\partial^2 L}{\partial \theta_1 \partial \lambda_1} & \frac{\partial^2 L}{\partial \theta_1 \partial \zeta_2} & \frac{\partial^2 L}{\partial \theta_1 \partial \lambda_2} & \cdots & \frac{\partial^2 L}{\partial \theta_1 \partial \zeta_n} & \frac{\partial^2 L}{\partial \theta_1 \partial \lambda_n} & \frac{\partial^2 L}{\partial \theta_1^2} & \frac{\partial^2 L}{\partial \theta_1 \partial \theta_2} & \cdots & \frac{\partial^2 L}{\partial \theta_2 \partial \theta_N} \\
\frac{\partial^2 L}{\partial \theta_2 \partial \zeta_1} & \frac{\partial^2 L}{\partial \theta_2 \partial \lambda_1} & \frac{\partial^2 L}{\partial \theta_2 \partial \zeta_2} & \frac{\partial^2 L}{\partial \theta_2 \partial \lambda_2} & \cdots & \frac{\partial^2 L}{\partial \theta_2 \partial \zeta_n} & \frac{\partial^2 L}{\partial \theta_2 \partial \lambda_n} & \frac{\partial^2 L}{\partial \theta_2 \partial \theta_1} & \frac{\partial^2 L}{\partial \theta_2^2} & \cdots & \frac{\partial^2 L}{\partial \theta_2 \partial \theta_N} \\
\vdots & \vdots & \vdots & \vdots & \vdots & \vdots & \vdots & \vdots & \vdots & \ddots & \vdots \\
\frac{\partial^2 L}{\partial \theta_N \partial \zeta_1} & \frac{\partial^2 L}{\partial \theta_N \partial \lambda_1} & \frac{\partial^2 L}{\partial \theta_N \partial \zeta_2} & \frac{\partial^2 L}{\partial \theta_N \partial \lambda_2} & \cdots & \frac{\partial^2 L}{\partial \theta_N \partial \zeta_n} & \frac{\partial^2 L}{\partial \theta_N \partial \lambda_n} & \frac{\partial^2 L}{\partial \theta_N \partial \theta_1} & \frac{\partial^2 L}{\partial \theta_N \partial \theta_2} & \cdots & \frac{\partial^2 L}{\partial \theta_N^2}
\end{bmatrix}_{t}^{-1}
\times
\begin{bmatrix} \frac{\partial L}{\partial \zeta_1} \\ \frac{\partial L}{\partial \lambda_1} \\ \frac{\partial L}{\partial \zeta_2} \\ \frac{\partial L}{\partial \lambda_2} \\ \vdots \\ \frac{\partial L}{\partial \zeta_n} \\ \frac{\partial L}{\partial \lambda_n} \\ \frac{\partial L}{\partial \theta_1} \\ \frac{\partial L}{\partial \theta_2} \\ \vdots \\ \frac{\partial L}{\partial \theta_N} \end{bmatrix}_{t}
$$