

$$\begin{aligned}
 &\text{maximize} : \mathbb{E}_x \log \frac{\det \left(\mathbf{G} \mathbf{V}^\top (\mathbf{C}_x + \mathbf{C}_{n_{\text{in}}}) \mathbf{V} \mathbf{G} + \mathbf{C}_{n_{\text{out}}} \right)}{\det \left(\mathbf{G} \mathbf{V}^\top \mathbf{C}_{n_{\text{in}}} \mathbf{V} \mathbf{G} + \mathbf{C}_{n_{\text{out}}} \right)},
 \end{aligned}$$