

$$\begin{aligned}
 J^\star &= \text{Tr} \bar{\mathbf{S}} \bar{\boldsymbol{\Sigma}} \mathbf{C}^* \mathbf{V}^{-1} \mathbf{C} \bar{\boldsymbol{\Sigma}} + \bar{\boldsymbol{\Sigma}} \mathbf{Q} \\
 &= \text{Tr} \bar{\boldsymbol{\Sigma}} \bar{\mathbf{S}} \mathbf{B} \mathbf{R}^{-1} \mathbf{B}^* \bar{\mathbf{S}} + \bar{\mathbf{S}} \mathbf{V} \mathbf{W},
 \end{aligned}$$