

$$\begin{aligned}
& \underset{\{\mathbf{w}_k \in \mathbb{C}^N\}_{k=1}^G}{\text{minimize}} && \sum_{k=1}^G || \mathbf{w}_k ||_2^2 \\
& \text{subject to:} && \frac{|\mathbf{w}_k^H \mathbf{h}_i|^2}{\sum_{l \neq k} |\mathbf{w}_l^H \mathbf{h}_i|^2 + \sigma_i^2} \geq c_i, \\
& && \forall i \in G_k, \forall k, l \in \{1, \dots, G\}.
\end{aligned}$$