

$$\begin{aligned}
\mathbf{w}(0) &= [1, 0, \dots, 0] \\
\mathbf{P}(0) &= \delta^{-1} \mathbf{I}_{M \times M} \\
\mathbf{z}(n) &= \mathbf{u}(n) \mathbf{u}^H(n) \left| \mathbf{u}^H(n) \mathbf{w}(n-1) \right|^{p-2} \\
\mathbf{k}(n) &= \frac{\mathbf{P}(n-1) \mathbf{z}(n)}{\lambda + \mathbf{z}^H(n) \mathbf{P}(n-1) \mathbf{z}(n)} \\
\xi(n) &= 1 - \mathbf{w}^H(n-1) \mathbf{z}(n) \\
\mathbf{w}(n) &= \mathbf{w}(n-1) + \mathbf{k}(n) \xi^*(n) \\
\mathbf{P}(n) &= \lambda^{-1} (\mathbf{P}(n-1) - \mathbf{k}(n) \mathbf{z}^H(n) \mathbf{P}(n-1))
\end{aligned} \tag{1}$$