

$$\begin{aligned}
& \min_{\{W_i, V_i, U_i\}_{i=1}^T} && \ell(V_T; Y) + \sum_{i=1}^T r_i(W_i) + \sum_{i=1}^T s_i(V_i) \\
& \text{subject to} && U_i = W_i V_{i-1}, \\
& && V_i = \sigma_i(U_i) \quad (i = 1, \dots, T)
\end{aligned}$$