

Note

$$\hat{p}^{k+1} - \hat{p}^k = T_s \Lambda^{-1} \left(-(\hat{H}_C - \hat{H}_T \bar{H}_T^{-1} \bar{H}_C) q_C(u^k) - \hat{H}_T \bar{H}_T^{-1} K \bar{d}_K^k + \hat{H}_T \bar{H}_T^{-1} D v_D \sigma^k \right)$$

$$f_C(q_C^k) - A_1(\hat{p}^k + \hat{h}) + A_2^T f_T(A_2 q_C^k + A_3 K \bar{d}_K^k - A_3 D v_D \sigma^k) = 0 \quad (1)$$

where

$$\begin{aligned} A_1 &= \hat{H}_C^T - \bar{H}_C^T \bar{H}_T^{-T} \hat{H}_T^T, \\ A_2 &= -\bar{H}_T^{-1} \bar{H}_C, \\ A_3 &= \bar{H}_T^{-1}. \end{aligned}$$

$$\bar{p}_K^k = K^T \bar{H}_T^{-T} f_T(A_2 q_C(u^k) + A_3 K \bar{d}_K^k - A_3 D v_D \sigma^k) - K^T \bar{H}_T^{-T} \hat{H}_T^T(\hat{p}^k + \hat{h}) - K^T \bar{h} \quad (2)$$

$$q_C^k = q_C((\hat{p}^k + \hat{h}), \bar{d}_K^k, \sigma^k) = q_C(u^k) \quad (3)$$

$$\tilde{f}_1(\cdot), \tilde{f}_2(\cdot)$$
