0.1 On calculation of $\hat{p}_c$

Our starting point is (3.54), from which we get

$$\hat{H}_{\mathcal{T}}^T \hat{p} = f_{\mathcal{T}}(q_{\mathcal{T}}) - \bar{H}_{\mathcal{T}}^T(\bar{p} + \bar{h}) - \hat{H}_{\mathcal{T}}^T \hat{h}. \tag{1}$$

By the definition of G and F we have

$$\hat{p} = G\hat{p}_c + F\hat{p}_t. \tag{2}$$

Using (2) in (1) and exploiting invertibility of $\bar{H}_{\mathcal{T}}$, we can derive

$$\bar{H}_{\mathcal{T}}^{-T} \hat{H}_{\mathcal{T}}^T G\hat{p}_c = \bar{H}_{\mathcal{T}}^{-T} f_{\mathcal{T}}(q_{\mathcal{T}}) - (\bar{p} + \bar{h}) - \bar{H}_{\mathcal{T}}^{-T} \hat{H}_{\mathcal{T}}^T \hat{h} - \bar{H}_{\mathcal{T}}^{-T} \hat{H}_{\mathcal{T}}^T F\hat{p}_t. \tag{3}$$

Evidently, the matrix $A = \bar{H}_{\mathcal{T}}^{-T} \hat{H}_{\mathcal{T}}^T G$ is tall, therefore if it has full rank (this is a question which is open), it has a left inverse, say $A^\dagger$. Using left invertibility of A, we obtain

$$\hat{p}_c = A^\dagger \bar{H}_{\mathcal{T}}^{-T} f_{\mathcal{T}}(q_{\mathcal{T}}) - A^\dagger(\bar{p} + \bar{h}) - A^\dagger \bar{H}_{\mathcal{T}}^{-T} \hat{H}_{\mathcal{T}}^T \hat{h} - A^\dagger \bar{H}_{\mathcal{T}}^{-T} \hat{H}_{\mathcal{T}}^T F\hat{p}_t. \tag{4}$$

However, we still have the problem that the (4) is dependent on $\bar{p}$.

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