

1 H2 approximation of linear dynamical systems

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We consider the problem of approximating an $m \times p$ rational transfer function $H(s)$ of high degree by another $m \times p$ rational transfer function $\hat{H}(s)$ of much smaller degree. We derive the gradients of the \mathcal{H}_2 -norm of the approximation error and show how this can be solved via tangential interpolation. We then extend these results to the discrete-time case, for both time-invariant and time-varying systems.