

University of Groningen

Hankel norm approximation for infinite-dimensional systems

Sasane, Amol Jagannath

IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

Document Version

Publisher's PDF, also known as Version of record

Publication date:

2001

[Link to publication in University of Groningen/UMCG research database](#)

Citation for published version (APA):

Sasane, A. J. (2001). *Hankel norm approximation for infinite-dimensional systems*. s.n.

Copyright

Other than for strictly personal use, it is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license (like Creative Commons).

The publication may also be distributed here under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license. More information can be found on the University of Groningen website: <https://www.rug.nl/library/open-access/self-archiving-pure/taverne-amendment>.

Take-down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Downloaded from the University of Groningen/UMCG research database (Pure): <http://www.rug.nl/research/portal>. For technical reasons the number of authors shown on this cover page is limited to 10 maximum.

Index

- 3–lines theorem, 60
- G , 17
- $H_2(E)$, 4
- H_G , 4
- $H_{\infty, [l]}(\mathbb{C}^{p \times m})$, 55
- $H_{\infty, [l]}^c(\mathbb{C}^{p \times m})$, 54
- $H_{\infty, l}(\mathbb{C}^{p \times m})$, 55
- $H_{\infty, l}^c(\mathbb{C}^{p \times m})$, 54
- $H_{\infty}(\mathbb{C}^{p \times m})$, 4
- $H_{\infty}^c(\mathbb{C}^{p \times m})$, 54
- J –spectral factorization, 88
- Q –dissipative, 111
- Q –space, 108
- X_{-1} , 16
- X_1 , 16
- Z_{θ} , 27
- Γ_h , 7
- Φ_t , 16
- Ψ , 17
- $C_{00}(0, \infty)$, 49
- $C_0(i\mathbb{R}, \mathbb{C}^{p \times m})$, 66
- $\mathcal{M}H_{\infty}^c$, 55
- \mathcal{R} , 55
- \mathcal{R}_{∞} , 55
- \mathcal{S} , 55
- \mathcal{T} , 55
- \cdot^{\dagger} , 88
- $\hat{\cdot}$, 7
- \mathbb{C}_r^+ , 54
- \mathbb{C}_r^- , 54
- $\nu(A)$, 103
- ω_0 , 23
- $\overline{\mathbb{C}_r^+}$, 54
- $\overline{\mathbb{C}_r^-}$, 54
- $\pi(A)$, 103
- $\sigma_k(G)$, 5
- $\sigma_k(H_G)$, 5
- $\zeta(A)$, 103
- $r(\cdot)$, 25
- AAK theorem, 6
- admissible control operator, 16
- admissible observation operator, 16
- algebraic multiplicity, 104
- approximately controllable, 121, 129
- Bezout identity, 55
- bounded control operator, 16
- bounded observation operator, 16
- conjugate linear, 18
- contraction semigroup, 155
- controllability Gramian, 24, 29
- controllability map, 24, 28
- dual of an operator, 21
- duality map, 18
- duality pairing, 19
- exponential detectability, 114
- exponentially stable, 7
- exponentially stable Pritchard-Salamon system, 24
- feedthrough operator, 18
- generalized Cauchy-Schwarz inequality, 107
- generating operators of a well-posed linear system, 18
- geometric multiplicity, 105

- Gram operator, 108
growth bound, 23
- Hankel, 2
Hankel matrix, 1
Hankel norm, 7
Hankel operator, 4, 24, 45
Hankel singular values, 5, 66
Hartman's theorem, 66
Hilbert matrix, 2
- impulse response, 7, 45
indefinite inner product, 106
inertia, 103
inertia theorems, 104
infinitesimal generator of a well-posed linear system, 18
- Laurent matrix, 74
Lyapunov equation, 81, 113
Lyapunov inequality, 106
- MacMillan degree, 5
Minkowski space, 108
model reduction, 8
- negative subspace, 107
negative vector, 106
Nehari, 1
Nehari's theorem, 3
neutral subspace, 107
neutral vector, 106
nonnegative subspace, 107
nonpositive subspace, 107
normal operator, 115
nuclear, 67
- observability Gramian, 24, 37
observability map, 24, 37
observable, 118
optimal Hankel norm approximant, 6
order of an eigenvalue, 104
output stable, 159
- pivot space, 19
- positive subspace, 107
positive vector, 106
Pritchard-Salamon admissible control operator, 22
Pritchard-Salamon admissible observation operator, 22
Pritchard-Salamon system, 23
- regular well-posed linear system, 18
representation of the dual space, 19
Riccati equation, 125, 136
right coprime, 55
right coprime factorization, 55
- Schur, 2
self-adjoint solution of a Lyapunov equation, 113
semidefinite subspace, 107
semigroup of a well-posed linear system, 18
singular value, 5
skew-symmetric, 67
smooth Pritchard-Salamon system, 23
- Sobolev space, 26
solution to the sub-optimal Hankel norm approximation problem, 6
spectrum decomposition assumption, 112
spectrum determined growth assumption, 155
strongly stable, 67
sub-optimal Hankel norm approximant, 8
sub-optimal Hankel norm approximation problem, 6
sub-optimal Nehari problem, 4
- time-domain Hankel operator, 7
transfer functions, 17
- unbounded control operator, 16
well-posed linear system, 17