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MODEL SPACES AND TOEPLITZ KERNELS IN REFLEXIVE HARDY SPACE

M. C. CÂMARA, M. T. MALHEIRO AND J. R. PARTINGTON

Abstract. This paper considers model spaces in an H_p setting. The existence of unbounded functions and the characterisation of maximal functions in a model space are studied, and decomposition results for Toeplitz kernels, in terms of model spaces, are established.

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REFERENCES

[1] C. BENHIDA, M. C. CÂMARA AND C. DIOGO, *Some properties of the kernel and the cokernel of Toeplitz operators with matrix symbols*, Linear Algebra Appl., **432**, 1 (2010), 307–317.

[2] M. C. CÂMARA AND J. R. PARTINGTON, *Near invariance and kernels of Toeplitz operators*, Journal d'Analyse Math., **124**, (2014), 235–260.

[3] P. L. DUREN, *Theory of H^p spaces*, Dover, New York, 2000.

[4] K. M. DYAKONOV, *Moduli and arguments of analytic functions from subspaces in H^p that are invariant under the backward shift operator* (Russian), Sibirsk. Mat. Zh., **31**, 6 (1990), 64–79; translation in Siberian Math. J., **31**, 6 (1990), 926–939 (1991).

[5] K. M. DYAKONOV, *Entire functions of exponential type and model subspaces in H^p* (Russian), Zap. Nauchn. Sem. Leningrad. Otdel. Mat. Inst. Steklov. (LOMI), **190**, (1991), Issled. po Linein. Oper. i Teor. Funktsii., **19**, 81–100, 186; translation in J. Math. Sci., **71**, 1, (1994), 2222–2233.

[6] K. M. DYAKONOV, *Continuous and compact embeddings between star-invariant subspaces*, Complex analysis, operators, and related topics, 65–76, Oper. Theory Adv. Appl., 113, Birkhäuser, Basel, 2000.

[7] K. M. DYAKONOV, *Kernels of Toeplitz operators via Bourgain's factorization theorem*, J. Functional Analysis, **170**, (2000), 93–106.

[8] O. FROSTMAN, *Sur les produits de Blaschke*, Kungl. Fysiogr. Sälsk. i Lund Förh., **12**, (1942), 169–182.

[9] T. W. GAMELIN, *Uniform algebras*, Second edition, American Mathematical Society, 2006.

[10] S. GARCIA AND W. T. ROSS, *Model spaces: a survey*. Invariant subspaces of the shift operator, 197–245, Contemp. Math., 638, Amer. Math. Soc., Providence, RI, 2015.

[11] E. HAYASHI, *The kernel of a Toeplitz operator*, Integral Equations Operator Theory, **9**, 4 (1986), 588–591.

[12] E. HAYASHI, *Classification of nearly invariant subspaces of the backward shift*, Proc. Amer. Math. Soc., **110**, 2 (1990), 441–448.

[13] D. HITT, *Invariant subspaces of $\mathscr{H}^2$ of an annulus*, Pacific J. Math., **134**, 1 (1988), 101–120.

[14] B. JACOB, J. R. PARTINGTON AND S. POTT, *Weighted interpolation in Paley–Wiener spaces and finite-time controllability*, Journal of Functional Analysis, **259**, (2010), 2424–2436.

[15] B. JACOB AND H. ZWART, *Properties of the realization of inner functions*, Math. Control Signals Systems, **15**, 4 (2002), 356–379.

[16] J. R. PARTINGTON, *An introduction to Hankel operators*, London Mathematical Society Student Texts, 13, Cambridge University Press, Cambridge, 1988.

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[17] N. K. NIKOLSKI, *Operators, functions, and systems: an easy reading*, Vol. 1, Mathematical Surveys and Monographs, vol. 92, American Mathematical Society, Providence, RI, 2002.

[18] D. SARASON, *Nearly invariant subspaces of the backward shift*, Contributions to operator theory and its applications (Mesa, AZ, 1987), 481–493, Oper. Theory Adv. Appl., 35, Birkhäuser, Basel, 1988.

[19] D. SARASON, *Kernels of Toeplitz operators*, Toeplitz operators and related topics (Santa Cruz, CA, 1992), 153–164, Oper. Theory Adv. Appl., 71, Birkhäuser, Basel, 1994.