A REALIZATION THEOREM FOR
GENERALIZED NEVANLINNA FAMILIES

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Abstract. Boundary relations for a symmetric relation in a Pontryagin space are studied and the corresponding Weyl families are characterized. In particular, it is shown that every generalized Nevanlinna family can be realized as the Weyl family of a boundary relation in a Pontryagin space.

REFERENCES

[1] T.YA. AZIZOV AND I.S. IOHVIDOV, *Linear operators in spaces with indefinite metric*, Nauka, Moscow, 1986 (Russian); English translation: John Wiley, New York, 1989.

[2] J. BEHRNDT, S. HASSI, AND H.S.V. DE SNOO, *Functional models for Nevanlinna families*, Opuscula Math. **28** (2008), 233–245.

[3] J. BEHRNDT, S. HASSI, AND H.S.V. DE SNOO, *Boundary relations, unitary colligations, and functional models*, Complex Anal. Oper. Theory **3** (2009), 57–98.

[4] J. BEHRNDT AND H.-C. KREUSLER, *Boundary relations and generalized resolvents of symmetric operators in Krein spaces*, Integral Equations Operator Theory **59** (2007), 309–327.

[5] V.A. DERKACH, *On Weyl function and generalized resolvents of a Hermitian operator in a Kreǐn space*, Integral Equations Operator Theory **23** (1995), 387–415.

[6] V.A. DERKACH AND H. DYM, *On linear fractional transformations associated with generalized J − inner matrix functions*, Integral Equations Operator Theory **65** (2009), 1–50.

[7] V.A. DERKACH, *Abstract interpolation problem in Nevanlinna classes*, Oper. Theory Adv. Appl. **190** (2009), 197–236.

[8] V.A. DERKACH, S. HASSI, M.M. MALAMUD, AND H.S.V. DE SNOO, *Boundary relations and their Weyl families*, Trans. Amer. Math. Soc. **358** (2006), 5351–5400.

[9] V.A. DERKACH, S. HASSI, M.M. MALAMUD, AND H.S.V. DE SNOO, *Boundary relations and generalized resolvents of symmetric operators*, Russ. J. Math. Phys. **16** (2009), 17–60.

[10] V.A. DERKACH AND M.M. MALAMUD, *Generalized resolvents and the boundary value problems for Hermitian operators with gaps*, J. Funct. Anal. **95** (1991), 1–95.

[11] V.A. DERKACH AND M.M. MALAMUD, *The extension theory of Hermitian operators and the moment problem*, J. Math. Sciences **73** (1995), 141–242.

[12] A. DIJKSMA, H. LANGER, AND H.S.V. DE SNOO, *Selfadjoint Π_κ -extensions of symmetric subspaces: an abstract approach to boundary value problems with spectral parameter in the boundary conditions*, Integral Equations Operator Theory **7** (1984), 459–515.

[13] A. DIJKSMA, H. LANGER, AND H.S.V. DE SNOO, *Hamiltonian systems with eigenvalue depending boundary conditions*, Oper. Theory Adv. Appl. **35** (1988), 37–83.

[14] A. DIJKSMA AND H.S.V. DE SNOO *Symmetric and selfadjoint relations in Kreǐn Spaces I*, Oper. Theory Adv. Appl. **24** (1987), 145–166.

[15] S. HASSI, H.S.V. DE SNOO, AND F.H. SZAFRANIEC, *Componentwise and canonical decompositions of linear relations*, Dissertationes Math. **465**, 2009, 59 pages.

[16] I. S. IOHVIDOV, M.G. KREĬN AND H. LANGER, *Introduction to the spectral theory of operators in spaces with an indefinite metric*, Mathematical Research 9, Akademie-Verlag, Berlin, 1982.

[17] M.G. KREĬN AND H. LANGER, *On defect subspaces and generalized resolvents of Hermitian operator in Pontryagin space*, Funkts. Anal. i Prilozhen. **5**, 2 (1971), 59–71; ibid. **5**, 3 (1971), 54–69 (Russian); English translation: Funct. Anal. Appl. **5** (1971), 136–146; ibid. **5** (1971), 217–228.

[18] M.G. KREĬN AND H. LANGER, *Über die verallgemeinerten Resolventen und die charakteristische Funktion eines isometrischen Operators im Raume* Π_κ, Hilbert Space Operators and Operator Algebras, Colloq. Math. Soc. Janos Bolyai, North-Holland, Amsterdam, **5** (1972), 353–399.

[19] M.G. KREĬN AND H. LANGER, *Über die Q–functions eines* π*–hermiteschen Operators im Raume* Π_κ, Acta Sci. Math. (Szeged) **34** (1973), 191–230.

[20] M.G. KREĬN AND M.A. NAIMARK, *The method of symmetric and Hermitians forms in the theory of the separation of the roots of algebraic equations*, Kharkiv, 1936, 43 p. (Russian); English translation: Linear and Multilinear Algebra **10** (1981), 265–308.

[21] E. NEIMAN, *A functional model associated with a generalized Nevanlinna pair*, Ukrainian Math. Bull. **7**, 2 (2010), 197–211.

[22] A.A. NUDEL'MAN, *On a new problem of moment type*, Dokl.Akad.Nauk SSSR **233** (1977), 792–795; Soviet Math. Dokl. **18** (1977), 507–510.

[23] YU.L. SHMUL'JAN, *Theory of linear relations, and spaces with indefinite metric*, Funkcional. Anal. i Priložen **10**, 1 (1976), 67–72.

[24] YU.L. SHMUL'JAN, *Transformers of linear relations in J-spaces*, Funkcional. Anal. i Priložen **14** (1980), 39–44 (Russian); English translation: Functional Anal. Appl. **14** (1980), 110–113.

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