Factorizations, invariant subspaces and multi-valency

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It is shown how the factorization of scalar generalized Nevanlinna functions, the (Krein-Langer) factorization of generalized Schur functions, the invariant subspace property of selfadjoint relations in Pontryagin spaces and the invariant subspace property of contractive operators in Pontryagin spaces are all essentially equivalent. To establish these connections the concept of multi-valency is a central tool. The concept of multi-valency not only provides new characterizations for the mentioned classes of functions and easier proofs for the afore-mentioned properties, but it also explains the fundamental difference between the factorization of (scalar) generalized Nevanlinna functions and the factorization of (scalar) generalized Schur functions.