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8. Analysis

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An invariance property of Quadratic forms

In complex Hilbert spaces we consider positive quadratic forms defined by self-adjoint positive operators S of finite trace. We show that the linear operators A that leave invariant such quadratic forms in the sense that $< Ax, SAx >=< x, Sx >$, are the operators for which the adjoint A^* has a spanning set of eigenvectors of norm 1. We obtain this result by solving for A operator equations of the form $KA = KU$ where U is an isometry and K is Hilbert-Smith.

Reference: E. Flytzanis, Unimodular eigenvalues and Invariant measures for linear Operators. *Monatshefte für Math.* **119** (1995), 267–273.