Some results on \((A; (m, n))-isosymmetric operators on a Hilbert space.\) (English) [Zbl 07581266]

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Summary: In this paper, we introduce the class of \((A; (m, n))-isosymmetric operators and we study some of their properties, for a positive semi-definite operator \(A\) and \(m, n \in \mathbb{N}\), which extend, by changing the initial inner product with the semi-inner product induced by \(A\), the well-known class of \((m, n)-isosymmetric operators introduced by Stankus (Isosymmetric linear transformations on complex Hilbert space. University of California, San Diego, Thesis, 1993, Integral Equ Oper Theory 75(3):301-321, 2013). In particular, we characterize a family of \(A\)-isosymmetric \((2 \times 2)\) upper triangular operator matrices. Moreover, we show that if \(T\) is \((A; (m, n))-isosymmetric and if \(Q\) is a nilpotent operator of order \(r\) doubly commuting with \(T\), then \(T^p\) is \((A; (m, n))-isosymmetric symmetric for any \(p \in \mathbb{N}\) and \((T + Q)\) is \((A; (m + 2r - 2, n + 2r - 1))-isosymmetric. Some properties of the spectrum are also investigated.

MSC:

47A55 Perturbation theory of linear operators
47B25 Linear symmetric and selfadjoint operators (unbounded)
47B37 Linear operators on special spaces (weighted shifts, operators on sequence spaces, etc.)
47B65 Positive linear operators and order-bounded operators
46C05 Hilbert and pre-Hilbert spaces: geometry and topology (including spaces with semidefinite inner product)

Keywords:

semi-Hilbert space; isosymmetric operators; \((A; (m, n))-isosymmetric operators; (A, m)-isometric operators; (A, m)-symmetric operators; spectrum; nilpotent perturbation

Full Text: DOI arXiv

References:


[19] Stankus, M., \((m)\)-Isometries, \((n)\)-symmetries and other linear transformations which are hereditary roots, Integral Equ Oper Theory, 75, 3, 301-321 (2013) · Zbl 1284.47015 · doi:10.1007/s00020-012-2026-0


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