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Several Spectrally Non-Arbitrary Ray Patterns of Order 4

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Abstract : A matrix is called a ray pattern matrix if its entries are either 0 or a ray in complex plane which originates from 0. A ray pattern A of order n is called spectrally arbitrary if the complex matrices in the ray pattern class of A give rise to all possible nth degree complex polynomial. Otherwise, it is said to be spectrally non-arbitrary ray pattern. We call that a spectrally arbitrary ray pattern A of order n is minimally spectrally arbitrary if any nonzero entry of A is replaced, then A is not spectrally arbitrary. In this paper, we find that is not spectrally arbitrary when n equals to 4 for any θ which is greater than or equal to 0 and less than or equal to n. In this article, we give several ray patterns A(θ) of order n that are not spectrally arbitrary for some θ which is greater than or equal to 0 and less than or equal to n. by using the nilpotent-Jacobi method. One example is given in our paper.

Keywords : spectrally arbitrary, nilpotent matrix , ray patterns, sign patterns
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