HURWITZ-RADON’S SYMPLECTIC ANALOGY AND HUA’S CYCLIC RECURRENCE RELATION∗

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Abstract. A symplectic version of the classical Hurwitz-Radon theorem is presented in this paper. This problem was first approached but without full success by L.K. Hua in a paper on geometry of matrices, in 1947. The present paper solves Hua’s problem in a complete and elementary way. As a consequence, a direct matrix proof of a related result of D.B. Shapiro, which is of independent interest, is given. It turns out that the symplectic version is closely related to Hurwitz and Radon’s original orthogonal version via a remarkable observation of Hua. Hua’s cyclic recurrence relation and its unitary version are also presented.

Key words. Hurwitz-Radon equations, Hurwitz-Radon theorem, Symplectic Hurwitz-Radon theorem, Hua’s cyclic recurrence relation.

AMS subject classifications. 15A04, 51N30.

∗Received by the editors on September 17, 2013. Accepted for publication on December 15, 2013.
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