NONNEGATIVE GENERALIZED DOUBLY STOCHASTIC MATRICES WITH PRESCRIBED ELEMENTARY DIVISORS

RICARDO L. SOTO†, ELVIS VALERO†, MARIO SALAS†, AND HANS NINA‡

Abstract. This paper provides sufficient conditions for the existence of nonnegative generalized doubly stochastic matrices with prescribed elementary divisors. These results improve previous results and the constructive nature of their proofs allows for the computation of a solution matrix. In particular, this paper shows how to transform a generalized stochastic matrix into a nonnegative generalized doubly stochastic matrix, at the expense of increasing the Perron eigenvalue, but keeping other elementary divisors unchanged. Under certain restrictions, nonnegative generalized doubly stochastic matrices can be constructed, with spectrum $\Lambda = \{\lambda_1, \lambda_2, \ldots, \lambda_n\}$ for each Jordan canonical form associated with $\Lambda$.

Key words. Stochastic matrices, Doubly stochastic matrices, Elementary divisors.

AMS subject classifications. 15A18, 15A51.