

ON THE EXPONENT OF R -REGULAR PRIMITIVE MATRICES*

M.I. BUENO[†] AND S. FURTADO[‡]

Abstract. Let P_{nr} be the set of n -by- n r -regular primitive $(0, 1)$ -matrices. In this paper, an explicit formula is found in terms of n and r for the minimum exponent achieved by matrices in P_{nr} . Moreover, matrices achieving that exponent are given in this paper. Gregory and Shen conjectured that $b_{nr} = \lfloor \frac{n}{r} \rfloor^2 + 1$ is an upper bound for the exponent of matrices in P_{nr} . Matrices achieving the exponent b_{nr} are presented for the case when n is not a multiple of r . In particular, it is shown that $b_{2r+1,r}$ is the maximum exponent attained by matrices in $P_{2r+1,r}$. When n is a multiple of r , it is conjectured that the maximum exponent achieved by matrices in P_{nr} is strictly smaller than b_{nr} . Matrices attaining the conjectured maximum exponent in that set are presented. It is shown that the conjecture is true when $n = 2r$.

Key words. r -Regular matrices, Primitive matrices, Exponent of primitive matrices.

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[†]Department of Mathematics, University of California, Santa Barbara, CA USA (mbueno@math.ucsb.edu). Supported by Dirección General de Investigación (Ministerio de Ciencia y Tecnología) of Spain under grant MTM2006-06671.

[‡]Faculdade de Economia do Porto, Rua Dr. Roberto Frias 4200-464 Porto, Portugal (sbf@fep.up.pt).