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QUASI-BLOCK-STOCHASTIC MATRICES

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The quasi-block-stochastic matrices are introduced as a generalization of the block-stochastic and the quasi-stochastic matrices. The derivation of theorems is possible which are similar to those derived for block-stochastic matrices by W. Kuich and K. Walk and for quasi-stochastic matrices by Haynsworth. Among other theorems the theorem on the group property, the reduction formula and its application to nonnegative matrices holds in a modified manner. An example illustrates the definitions and theorems.

NOTATION

$A = (a_{ij})$	quasi-block-stochastic matrix
A_{ij}	block of A
$a_{ij}^{(n)}$	element of A^n
$a^{(n)}$	vector of generalized row sums of A^n
$a_i^{(n)}$	i^{th} generalized row sum of A^n
$S_A = (s_{ij})$	matrix of the generalized row sums of the blocks
$s_{ij}^{(n)}$	element of S_A^n
$s^{(n)}$	vector of row sums of S_A^n
$s_i^{(n)}$	i^{th} row sum of S_A^n
$l \times l$	dimension of A
$l_i \times l_j$	dimension of A_{ij}
$k \times k$	dimension of S_A
I_l	identity matrix of order l
P	permutation matrix
$e_j = \begin{pmatrix} 1 \\ d_{n_j+2} \\ \vdots \\ d_{n_{j+1}} \end{pmatrix}$	of dimension l_j
u_i	i^{th} unit vector of dimension l
v_i	i^{th} unit vector of dimension k
$f_j = \sum_{i=n_j+1}^{n_{j+1}} d_i u_i$	
λ	eigenvalue
μ	greatest eigenvalue
$\delta_{ij} = 1$	for $i = j$
$= 0$	otherwise
$\varnothing$	null matrix
$n_j = \sum_{i=1}^{j-1} l_i$	$n_1 = 0$.