

# The Bruhat Order for $(0,1)$ -matrices

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## Abstract

There is a classical (partial) order on permutations of  $\{1, 2, \dots, n\}$  called the Bruhat order, denoted  $\preceq_B$ , whereby for permutations  $\sigma$  and  $\tau$ ,  $\sigma \preceq_B \tau$  if and only if  $\sigma$  can be obtained from  $\tau$  by a sequence of transpositions each of which reduces the number of inversions. The Bruhat order was extended in (1) R.A. Brualdi and S.-G. Hwang (*ELA* **12**, 2004/2005, #3) to classes  $\mathcal{A}(R, S)$  of  $(0,1)$ -matrices with row sum vector  $R$  and column sum vector  $S$ . The Bruhat order on permutations has two equivalent definitions that are not, in general, equivalent on  $\mathcal{A}(R, S)$  as shown in (2) R.A. Brualdi and L. Deaett (*Linear Algebra Applics.*, to appear) where further results on the Bruhat order on  $\mathcal{A}(R, S)$  are obtained. In this talk we review the Bruhat order on permutations and its generalization to  $\mathcal{A}(R, S)$ .