## Nonsingularity of Divisor Tournaments

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## Abstract

Matrix theoretic properties and examples of divisor tournaments are discussed. Emphasis is placed on results and conjectures about the nonsingularity of the adjacency matrix for a divisor tournament.

**Definition 1** For an integer n > 2, the divisor tournament  $D(T_n)$  (a directed graph on the vertices  $2, 3, \dots, n$ ) is defined by: i is adjacent to j if i divides j, otherwise j is adjacent to i for  $2 \le i < j \le n$ . No vertex is adjacent to itself.

**Definition 2** The adjacency matrix  $T_n$  of the directed graph  $D(T_n)$  with vertex set  $\{2, 3, \dots, n\}$  is the  $(n-1) \times (n-1)$  matrix  $[t_{ij}]$  defined by  $t_{ij} = 1$  and  $t_{ji} = 0$  if  $i \mid j$ ,  $t_{ij} = 0$  and  $t_{ji} = 1$  if  $i \nmid j$  for  $2 \le i < j \le n$ .  $t_{ii} = 0$  for  $i \in \{2, 3, \dots, n\}$ .