



Carlos Samuels & Damar Saul

Medgar Evers College

Computing Commuting Partitions

carlos.samuels@student.mec.cuny.edu

damar.saul@student.mec.cuny.edu

A square matrix N is called nilpotent if $N^k = 0$ for some positive integer k . By the Jordan Normal Form Theorem, the conjugacy classes of nilpotent $n \times n$ matrices are in one-to-one correspondence with the partitions of n . We say that two partitions P and Q of n commute if there is a nilpotent matrix A of partition P and nilpotent matrix B of partition Q such that $AB = BA$.

In this undergraduate research project, we are using the open-source mathematics software system *Sage* to find all the partitions that commute with a partition $P = (u, u - r)$ where $u > r > 1$.