1067-05-805   **Ryan K Therkelsen*** (`rtherkelsen@bellarmine.edu`), Mathematics Department, Bellarmine University, 2001 Newburg Road, Louisville, KY 40205. *Order in the Conjugacy Decomposition of the Rook Monoid.* Preliminary report.

The rook monoid R_n consists of the $(0,1)$-matrices of size n, having at most one non-zero entry in each row and each column. The Gauss-Jordan elements $\mathcal{GJ}$ of R_n are those elements in reduced row echelon form. Our object of study is the partially ordered set $\mathcal{P}$ whose elements are the conjugacy classes of $\mathcal{GJ}$ with a partial order defined in terms of a generalized dominance order on partitions of m, for $0 \leq m \leq n$. We present a new decomposition of $\mathcal{P}$, in terms of partitions, that we use to describe an order-preserving map between elements in $\mathcal{P}$ whose representatives have different rank. Analogous maps have been found for R_n that provide insight into its structure, under the Bruhat-Chevalley order. Time permitting, we will comment on how $\mathcal{P}$ fits in with a decomposition of $M_n(k)$ related to conjugacy classes. (Received September 15, 2010)