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Ryan K Therkelsen* (rtherkelsen@bellarmine.edu), Mathematics Department, Bellarmine University, 2001 Newburg Road, Louisville, KY 40205. *A new description of the Bruhat-Chevalley order on Gauss-Jordan elements in the Renner monoid.* Preliminary report.

The orbits of the action of $GL_n(k)$ on $M_n(k)$ by left multiplication are classified by the matrices in reduced row echelon form. For the Renner monoid of a reductive monoid, the orbits for the similar action on the left by its unit group are classified by the Gauss-Jordan elements. Formally, these are the elements satisfying containment relations of certain cosets of a Borel subgroup of the unit group of the monoid. For $M_n(k)$, the Renner monoid is the set of partial permutation matrices and the Gauss-Jordan elements are exactly those matrices in row echelon form, as we would hope. The inherited Bruhat-Chevalley order on these elements has a very nice combinatorial description — this description will be examined for the case that $M = M_n(k)$ as well as, time permitting, the case that M is a canonical monoid. (Received September 21, 2011)