1163-90-598   **Gábor Pataki** and **Aleksandr Touzov*** (`touzov@live.unc.edu`). *A normal form to construct all weakly infeasible semidefinite programs and bad projections of the PSD cone.* Preliminary report.

A weakly infeasible semidefinite program (SDP) has no feasible solution, but it has nearly feasible solutions that approximate the constraint set to an arbitrary precision. These SDPs are ill-posed and numerically often unsolvable. They are also closely related to "bad" linear projections that map the cone of positive semidefinite matrices to a nonclosed set. We develop a simple normal form of weakly infeasible SDPs with the following traits: it is obtained mostly by elementary row operations (inherited from Gaussian elimination); it makes weak infeasibility evident; and using it we can construct any weakly infeasible SDP or bad linear projection by an elementary algorithm. (Received September 10, 2020)