1011-47-79   **David R. Larson***, Department of Mathematics, Texas A&M University, College Station, TX 77845-3368. *The Well-Posed Matrix Completion Problem.* Preliminary report.

Matrix completion problems have been widely investigated by a number of researchers, with potential applications to engineering, as well as for their connections with the mathematical theory of hyperreflexivity of operator algebras. Most results in the literature have dealt with formulas and algorithms, and the special cases where they apply. A few years ago this author, with Don Hadwin and Dan Timotin, introduced a new point of view in matrix completion problems: tackling such problems from a "well-posedness" point of view. It turned out that certain such problems are well-posed in the sense of uniqueness and stability of an optimal solution, even if traditional algorithms for distance and optimality might fail. We showed, in particular for the special case of the algebra of 3x3 diagonal complex matrices, the cases in which the traditional algorithm (Arveson's distance estimate) yields optimality for distance have the technical difficulty that uniqueness fails, whereas the cases in which the Arveson distance estimate fails to give an optimal distance are all, in fact, cases of well-posedness. In this talk we build onto this work further, raising some open questions that we feel are interesting. (Received August 15, 2005)