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Daniel E Poore* (daniel.poore@pomona.edu), 170 E 6th St Suite 132 Box 283, Claremont, CA 91711. *Analytic Properties of Unitary Equivalence to Constant Diagonal Matrices*. Preliminary report.

It is a well know fact that any matrix is unitarily equivalent to a matrix with constant diagonal entries. However, current proofs of this are only existential, and provide no assistance in actually constructing such a matrix. We derive an explicit algorithm of $O(n)$ steps for finding a unitary that performs such a change. We also show that as a function mapping matrices to corresponding unitaries, this algorithm is continuous on an open, dense, subset of \mathbb{M}_n . Furthermore, we examine generic points of discontinuity of all such functions, and construct a finite set of functions such that at least one is continuous wherever possible. (Received August 13, 2009)