



LEAST SQUARES INVERSE EIGENVALUE PROBLEMS

Meghan E Kelly *University of Illinois*

Abstract of Poster: Pure mathematics often has applications to the real world, but sometimes these applications occur long after the original work is done. Also, sometimes specific applied questions lead to new directions of study in pure mathematics. The study of inverse eigenvalue problems is one of the areas of linear algebra that shows these types of interplay of pure and applied mathematics. The general idea of an inverse eigenvalue problem is to construct a matrix with certain specific structure as well as details about its eigenvalues that are desired. But in many applications it is possible that there is incomplete information and so the inverse eigenvalue problem has to be paired with an approximation too. We consider such least-squares inverse eigenvalue problems in special cases. In particular, we look at the combinatorial problem of getting the least-squares matching of a subset of the eigenvalues of a matrix (from a suitable class of matrices) to some prescribed target eigenvalues. A good general reference that surveys inverse eigenvalue problems is the article by Moody Chu, Inverse eigenvalue problems, SIAM REV. 40 no. 1 (1998) 1-39. See Section 4 of this article for a summary of least-squares inverse eigenvalue problems.