1077-65-1285 **Homer F. Walker*** (walker@wpi.edu), Worcester Polytechnic Institute, Mathematical Sciences Department, 100 Institute Road, Worcester, MA 01609-2280. *Anderson Acceleration for Fixed-Point Iterations.*

Fixed-point iterations occur naturally and are commonly used in a broad variety of computational science and engineering applications. In practice, fixed-point iterates often converge undesirably slowly, if at all, and procedures for accelerating the convergence are desirable. This talk will focus on a particular acceleration method that originated in work of D. G. Anderson [J. Assoc. Comput. Machinery, 12 (1965), 547-560] and has been independently re-invented on at least two occasions. This method has enjoyed considerable success in a few applications (notably in electronic-structure computations, where it is known as *Anderson mixing*) but seems to have been untried or underexploited in many other important applications. Moreover, while other acceleration methods have been extensively studied by mathematicians and numerical analysts, Anderson acceleration has received relatively little attention from them until recently, despite there being many significant unanswered mathematical questions. In this talk, I will outline Anderson acceleration, discuss some of its theoretical properties, and demonstrate its performance in several PDE applications. This work is joint in part with P. Ni and in part with P. A. Lott, C. S. Woodward, and U. M. Yang. (Received September 18, 2011)