History and applications of nonlinear eigenvalue problems

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Matrix analysis is a powerful tool in the study of modern phenomena and in the application of mathematics in science, engineering, medicine, economics, physics and other scientific disciplines. The eigenvalue analysis, due to its numerous applications, represents an attractive area of applied mathematics. During the 20th century, various researches on the topic of eigenvalue theory were carried out. Hence the idea of this paper is to give an overview of the history of the origin of this type of problem, as well as its applications, primarily in engineering, which would make this paper useful as a starting point for further studies of these specific problems. In addition, the goal of this paper is to help students of engineering sciences in understanding the application of some mathematical methods in engineering, providing a solid basis for further dealing with nonlinear eigenvalue problems.