

THE 1975 SUMMER RESEARCH CONFERENCE ON SINGULAR PERTURBATIONS: THEORY AND APPLICATIONS

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This issue of the Rocky Mountain Journal of Mathematics is devoted to the proceedings of the National Science Foundation Summer Research Conference on singular perturbations held at Northern Arizona University in Flagstaff, Arizona from June 23-27, 1975. The conference was directed by Professor Lawrence M. Perko (Northern Arizona University) with the support of Professor Robert E. O'Malley, Jr. (University of Arizona).

The conference featured Professor William A. Harris, Jr. (University of Southern California) as principal lecturer. Professor Harris gave ten one-hour talks which included an in-depth study of singularly perturbed two point boundary value problems for ordinary differential equations, diagonalization techniques, use of differential inequalities and approximate solutions, problems on large (expanding) intervals, multiple time scales, turning points, bifurcation theory and elementary control theory. It is anticipated that Professor Harris' lectures will appear as a Conference Board on Mathematical Sciences publication.

The conference featured four special guest lecturers: Professor John V. Breakwell (Stanford University) who discussed asymptotic matching for planetary fly-bys; Professor Donald S. Cohen (California Institute of Technology) who discussed instabilities in chemically reacting mixtures; Professor Petar V. Kokotovich (University of Illinois — Urbana) who discussed the application of singular perturbations to control theory; and Professor George C. Papanicolaou (Courant Institute — N.Y.U.) who discussed probabilistic problems and methods in singular perturbations. In addition to the four guest lecturers, Professor Paco A. Lagerstrom (California Institute of Technology) discussed forms of singular asymptotic expansions in layer type problems.

Singularly perturbed initial value problems and boundary value problems for ordinary and partial differential equations were included in this conference. Applications included singularly perturbed problems from electrical network theory, conservative systems, the restricted three body problem, the scattering of waves, wave motions in simple model atmospheres, heat conduction and diffusion problems and flow past a slender body of revolution. These applications as well as the papers of the special guest lecturers appear in these proceedings.

In my estimation, the conference provided a pleasant setting for a large number of researchers with diverse and varied backgrounds in singular perturbation theory and applications to get together and exchange ideas and discuss problems of mutual interest. These proceedings should provide a valuable collection of information on singular perturbation theory and applications for both the student interested in learning more about the subject and the expert interested in carrying these ideas and techniques still further.

I would like to take this opportunity to express my thanks to Professor Robert O'Malley, Jr. for his help and direction in putting this conference together and to our secretary, Miss Colleen Halpin for her help and good spirits during the conference.

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