OPTIMAL CONTROL THEORY AND ITS APPLICATIONS

Lecture Notes in Economics and Mathematical Systems. Systems Theory

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These volumes contain the Proceedings of fourteenth Biennial Seminar of the Canadian Mathematical Congress held at the University of Westen Ontario in August 1973.

The first volume contains general surveys on most actual and important topics in control theory. The general theory is mainly represented by the big paper (almost 150 pages) of J. L. Lions covering several aspects of control theory for distributed parameter systems (optimal control and free surfaces, a priori feedback and variational inequalities, a priori feedback and quasivariational inequalities, constraints on the state, non linear state equations, problems where the control variable contains geometrical arguments, cheap control, impulse control, numerical methods) as developed by the French school. Hubert Halkin gives the general lines of the abstract theory of necessary conditions that gives a modern presentation of Pontyagrin maximum principle. The paper of W. M. Wonham gives a sketch of the newest aspects of linear control theory (a summary of his book published in the same colection, no. 101). H. T. Banks shows biological problems which can be described by models based on ideas in control theory, while R. M. Thrall expresses some general ideas in game theory. The second volume contains many contributions and it would be useless to mention here all of them. Most of these contributions, some of them extremely interesting give new mathematical results or survey recent results and personally I would like to stress that many of them are concerned with functional differential equations. Given the specific of this journal I think it important to mention the papers of R. Bodkin giving a very short description of the "Candide Model" (Canadian Disaggregated Inter-Departamental Econometric Model) of Colin W. Clark discussing some applications of optimal control theory to probelms in biological resource exploitation, of S. Sethi reviewing several models in advertising based on optimal control theory and of Sethi & Meguire on the application of the maximum principle to a heterogeneous labour model with retarded controls.

In this short review it is impossible to give more information on the very rich contents of these two volumes. We want only to say that this is a real major contribution to the very extended literature concerning control theory, of real value as well both for mathematicians working in this area as for people interested in applications.

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