PAPERS ON THE CONTROL OF DISTRIBUTED PARAMETER AEROELASTIC SYSTEMS

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FOREWORD

This work was sponsored by the Air Force Flight Dynamics Laboratory of the Research and Technology Division under Project No. 8225, Task No. 822501. It was initiated 1 May 1963 and completed 1 November 1964 at International Business Machines Corporation, San Jose Research Laboratory, San Jose, California, under Contract No. AF33(657)-11545. The project engineers for the Flight Dynamics Laboratory were E. B. Stear and R. Haas, (FDCL), successively, and the principal investigators at International Business Machines Corporation were J. E. Bertram and P. K. C. Wang, successively. The main participants of this work have been M. L. Bandy and W. E. Langlois. R. W. Koepcke and L. A. Skinner also assisted in the initial and final phases of this work, respectively. J. H. Eaton, manager of the Control Systems Research Department, assumed the administrative responsibility of this study project in January 1964.

Each section of this report is, in reality, a self-contained paper on the subject matter included. In addition to the papers included in this report, the following papers were written under support of Contract AF33(657)-11545.

1. P. K. C. Wang, "Control of Distributed Parameter Systems (Advances in Control Systems, Theory and Applications, Academic Press, 1964, pp. 75-172).

2. P. K. C. Wang and M. L. Bandy, "On the Stability of Equilibrium of a Diffusion System with Feedback Control, (IBM Research Note No. NJ-56).

3. W. L. Langlois, Notes on Partial Differential Equations - Part I, General Concepts, and Part II, First Order Equations (IBM Research Report No. RJ-272).

4. W. L. Langlois, Notes on Partial Differential Equations - Part III, Classification Theory (to be published as an IBM Research Report).

Manuscript of this report was released by the authors 25 June 1965 for publication as an RTD technical report.

Publication of this report does not constitute Air Force approval of the report's findings or conclusions. It is published only for the exchange and stimulation of ideas.

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ABSTRACT

This work was undertaken in order to gain a more fundamental understanding of the control of distributed parameter systems, with emphasis on the control of flexible aerodynamic vehicles. The main effort was on the development of a control theory for distributed parameter systems rather than the development of techniques for approximating distributed parameter systems by lumped parameter systems for which existing control theory is applicable.

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