

**DYNAMIC AND TRANSIENT STABILITY  
ANALYSIS OF A TWO-MACHINE SYSTEM**

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**Thesis Submitted in Partial Fulfilment of  
The Degree of Doctor of Philosophy, in  
Electrical Engineering.**

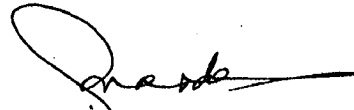
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1974

CERTIFICATE

This is to certify that I have personally supervised the work done by Mr. Tapan Kumar Basu during 1970-74 which is presented in the thesis entitled "Dynamic and transient stability analysis of a two-machine system".

Delhi,  
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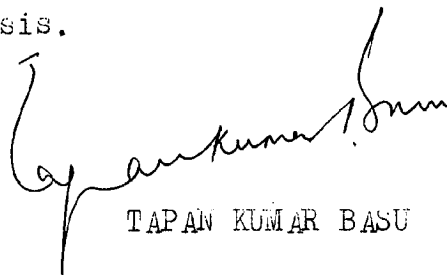
## PREFACE

The thesis contains the results of investigations carried out by the author at the Department of Electrical Engineering, Indian Institute of Technology, Delhi, over the period November 1970 to July 1974. The author has been on the look out for a general approach to the stability problems of power systems from a control engineers viewpoint. To the authors' belief there exists a communication gap between the control engineers and power system engineers. In spite of the fact that there has been a phenomenal increase in the size and complexity of power systems all over the world and a rapid advancement in the theory of automatic control, these two areas of electrical engineering practically developed independent of each other - the interaction of these two fields has been insignificant except in the recent past.

The already existing superior analytical techniques of control system have been tried on a system which can be identified with many of the power systems expected to come up in India in near future. The study made here gives the essential features of a regulating system, so that the design engineer has the knowledge to perfect its performance. Some of the results presented in this work are believed to be significantly new. These new results are spread over Chapters 2 to 6. Of these, Chapters 2 and 3 consider the dynamic stability of the system, Chapters 4 and 5 the transient stability of the system and Chapter 6 considers the effects of a practical and a theoretical

governor on both dynamic and transient stability of the system.

The author would like to take this opportunity to record his appreciation on the effective guidance of Prof. J. Nanda, of the encouragement and assistance of Prof. A.K. Mahalanabis, Head of the Department of Electrical Engineering, I.I.T., Delhi. The author would also like to extend his sincere gratitude to the authorities of Council of Scientific and Industrial Research for the financial assistance provided to him, to his colleagues Dr. M.C. Srivastava (B.I.T.S. Pilani), Mr. D.K. Srivastava (University of Roorkee) for their constant encouragement and many helpful suggestions. Finally he would like to thank all the staff members of the Computer Centre, I.I.T. Delhi, Mr. Rajnish Amba, Mr. Rajeev Vedi, Mr. K Das Nag and Mr. K.S. Saini of Regional Engineering College, Kurukshetra for their kind help in preparing the thesis.



TAPAN KUMAR BASU

Kurukshetra,  
November 15, 1974.

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