

**SOME STUDIES IN MODELING AND CONTROL
OF HYDROLOGICAL SYSTEMS**

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SOME STUDIES IN MODELING AND CONTROL
OF HYDROLOGICAL SYSTEMS

BY

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CERTIFICATE

This is to certify that the thesis entitled 'Some Studies in Modeling and Control of Hydrological Systems' being submitted by Satya Sheel for the award of the degree of Doctor of Philosophy to the Indian Institute of Technology, Delhi, is a record of the original bonafide research work carried out by him under our guidance and supervision. The results contained in this thesis have not been submitted to any other university or institute for award of any degree or diploma.

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Dedicated to
my parents

PREFACE

The thesis is based on the results of investigations carried out by the author in the area of estimation and control, at the Department of Electrical Engineering, Indian Institute of Technology, Delhi, during the period July 1977 to May 1981. The aim of this thesis has been to develop some prediction and control algorithms and to apply them to hydrological systems using real data. An algorithm has been proposed for prediction of stochastic processes involving periodicities in the output. The modeling of input variables, viz., rainfall and riverflow, to such systems has been taken up first and both the existing and proposed prediction algorithms have been tested with real data. Later, self tracking controller has been proposed for both time-series and state space models which minimises the error between the system output and some desired output trajectory. The application of this algorithm has been illustrated for simulated hydrological systems.

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