

## Preface

Systems are excited by signals and signals are in turn processed by systems. There is thus an intimate relationship between the simple concepts of systems and signals. These concepts have found wide applicability in many areas of electrical engineering and in other engineering disciplines as well. A Conference on Systems and Signal Processing was held in Bangalore during December 11–13, 1986 to commemorate the Platinum Jubilee of the Department of Electrical Engineering at the Indian Institute of Science. This Department came into existence in July 1911 and is a pioneer in electrical engineering education and research in the country. It has a rich tradition of research activity and has research interests broadly in the areas covered by the conference.

The conference provided a forum for the interaction of experts in India and abroad generally interested in systems and signals in their various ramifications. A total of 120 papers were accepted for presentation in various areas ranging from power systems to artificial intelligence. A subset of these papers was further reviewed and accepted for publication in this Journal. This is the first of the special issues containing selected papers from the conference.

The papers in this issue are concerned with power systems and drives. The first paper by Sobierajski considers probabilistic load flow equations. Given the expected values of bus powers and their second moments, the paper gives a method to evaluate the expected values and second order moments of the rectangular components of bus voltages which are assumed to have normal multidimensional distributions. The procedure involves solution of nonlinear equations of the fourth degree.

U. K. Sarma *et al* deal with the problem of medium range forecast of daily electric power demand spanning one to two weeks. Periodic nature of the data is exploited by grouping it into seven subgroups corresponding to each week day and each day's data is transformed into the

frequency domain though DFT. Forecasts are made using the Inverse Fourier Transform.

Load dispatch is the topic of the paper by Nanda *et al*, who argue that because of environmental considerations operations at absolute minimum cost cannot be the only basis for dispatching electric power. A new computational approach is proposed to find economic dispatch as well as minimum emission dispatch. The technique is demonstrated on a sample six-generator system.

The paper by Kozik deals with the reliability analysis of generation systems. An accurate method for determining the generalised characteristic curves to obtain power system as well as single unit forced outage reserves is presented. The paper also illustrates the method of using these curves to determine the contribution of the generating units for covering the peak load as well as the system outage reserve.

There are two papers on electric drives – one deals with induction motor drives and the other is concerned with brushless DC motor. Prasad Enjeti *et al* present a comparative study of some of the available modulation strategies for induction motor drives. The comparison of various schemes is based on harmonic losses, acoustic noise and pulsating torque factors. Ramanarayanan *et al* present the application of sliding mode control to permanent magnet synchronous motor. The drive is referred to as a brushless DC motor, as DC motor-like characteristics are obtained through field orientation. The authors discuss the theoretical concepts as well as design issues.

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