

IEEE CIRCUITS & SYSTEMS SOCIETY
POWER SYSTEMS & POWER ELECTRONICS COMMITTEE

The purpose of the Power Systems & Power Electronics Committee is for the advancement of the particular area of circuit and system theory, including the techniques of modeling, analysis, and design, which is related to the power systems and power electronics applications. The scope of power systems applications to be considered includes all aspects of the planning and analysis of systems for the generation, transmission, distribution, and control of electric energy. The scope of power electronics applications to be considered includes all aspects of the analysis and design of power semiconductor circuits, including device modeling.

A circuit or system is an interconnection of devices and components. The theory related to the device modeling, and the analysis and design of their interconnection is the field of interest of the Society. Power systems and power electronics are concerned with interconnection of devices and components for special applications. Relevant theory for power systems and power electronics applications is of general interest to the Society. This Committee is formed to facilitate its growth within the Society.

In the early years of the development of power systems analysis and circuit theory, power networks were the primary focus of research in circuit theory and the results of circuit theory were immediately applied to the solution of power system problems. There was then a period, however, during which the two disciplines were more or less developed along independent paths. Today the range of applications of modern circuit theory to problems

in power systems and power electronics areas suggest strongly the need for renewed joint activity. Indeed there are many topics common to the Circuit and Systems area and the Power area. Closer interaction between the two groups will undoubtedly result in mutual benefits and will also open up new areas of common interest. The Committee is set up with a view to encourage close interaction between the two groups in order to promote cross-fertilization.

The areas in power systems and power electronics to which the members of the Society might contribute are numerous. The Committee shall stimulate research and provide a forum for technical information exchange for the members of the Society. Some of the areas of perhaps initial interest are given below:

Since various problems in power system planning and power electronic circuit design can be formulated as optimization problems, the development of special optimization techniques taking advantage of the structural properties of power systems or circuits is an area of interest of the Committee.

Computer-aided analysis techniques have been proposed for power system transmission planning. Methods similar to computer-aided circuit analysis methods have been utilized in power system electromagnetic transient analysis. Computer-aided design (CAD) programs have been used in the design of power electronic circuits. Two areas of interest arise in the application of CAD techniques to these power problems. One is the development of various circuit models of power devices, e.g., power transistors and thyristors, lightning arresters, saturable reactors. The modeling of these devices would inevitably introduce nonlinear and time-varying elements. Therefore another area of interest is the development of efficient tools for the analysis and simulation of nonlinear and time-varying circuits arising from power applications.

A power system is a large-scale system. The development of special large-scale system techniques for power applications is another area of interest to the Committee. This area includes the development of reduced-order models and the development of efficient numerical methods for digital simulation of power systems. Another area of interest is the development of large-scale network techniques for power transmission and distribution systems reliability evaluation.

The stability analysis of interconnected power systems and the development of control strategies for such systems are also among the areas of interest of the Committee.

The application of power electronics tends to be diverse and more fragmented. Associated with each application are questions of efficiency, stability, control strategy, and circuit complexity. Common to all applications is the possibility of improvement to be derived from circuit and system classification, analysis and innovation. Another area of interest to the Committee is to improve and to expand applications of power electronics through the techniques of circuits and systems theory.

The primary function of the Committee is to promote close cooperation and exchange of technical information among the members of the Society and other Societies of IEEE. The Committee will organize special sessions and workshops on power systems and power electronics during the International Symposium on Circuit and Systems. It will invite and solicit tutorial and research papers in the areas of Power Systems and Power Electronics, that are of interest to the members of the Society, to be published in the Transactions. The Committee will sponsor alone, or jointly with other Societies, if interest warrants, the publication of a Special Issue of the Transactions on Power Systems or Power Electronics. The Committee will also sponsor, if the need arises, special publications, e.g., IEEE Press, in its areas of interest.