

ELECTRIC TRANSIENTS

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Electric Transients by Carl Edward Magnusson & A. Kalin & J. R. Tolmie

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CARL EDWARD MAGNUSSON & A. KALIN & J. R. TOLMIE

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ELECTRIC TRANSIENTS

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PREFACE

Transient electric phenomena generally increase in commercial importance with the size and complexity of electric systems, and a knowledge of the fundamental principles of electric transients and their application to the solution of quantitative problems is as essential to the successful operation of large power and communication systems as a mastery of the basic laws of direct and alternating currents.

This work is an outline of an introductory lecture and laboratory course given during the past twelve years to electrical engineering students in the University of Washington. The purpose of the book is to aid the student in gaining clear concepts of the fundamental principles of electric transient phenomena and their application to quantitative problems. The course as outlined is professedly of an elementary character with emphasis placed on the physical properties of electric transients. The text is illustrated and supplemented by a large number of oscillograms of transients that occur in the various types of machines and electric circuits in common use in electrical engineering laboratories. The problems are based on quantitative data obtained from laboratory experiments under circuit conditions that may easily be reproduced by the student.

Quantitative laboratory work is essential in order to readily gain insight into the physical nature of transient electric phenomena. It is advisable to require the student to devote at least two-thirds of the time allotted to a course in electric transients to the taking of oscillograms. Adjusting an oscillograph so as to obtain sharply defined, well proportioned oscillograms of electric transients is an effective method for acquiring due appreciation of quanti-

tative values, both absolute and relative, of the factors involved. The quality of the photographic record depends as much on painstaking care in handling the films and in developing and printing the oscillograms as on skilful operation of the oscillograph. Many pitfalls in the photographic part of the work may be avoided by carefully following the directions given in the Appendix.

No attempt is made to give references to original investigations or to papers and books dealing with the various phases of electric transient phenomena, as the principles discussed are well established and the material is arranged in text book form. A distinctive feature of the book lies in the illustrations. All of the oscillograms were taken by A. Kalin and J. R. Tolmie or by students in the course under their direction in the electrical engineering laboratories of the University of Washington.

C. EDWARD MAGNUSSON.

SEATTLE, WASH.,
March, 1922.

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