FLUID POWER SYSTEMS

Theory, worked examples and problems

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Mechanical Engineering
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PREFACE

Many books have been written on the subject of fluid power since the well-known works of Blackburn, Reethof and Shearer. Many of these were inspired by research, or projects, undertaken by their authors. As a teacher I have written this book with the needs of students in mind. My aim was to provide a text giving a learning-by-example treatment of the various systems used in fluid power. Basic theory is established in each chapter and selected worked examples cover many particular points in detail. Many additional problems are included for the reader to solve and these may be selected for H.N.C., H.N.D., C.E.I.2 and B.Sc. levels. Post-graduate students, specialising in this area of work, may also find the book of considerable help in their studies.

I have started with basic hydraulic components as sub-systems and defined them in terms of their steady-state characteristics. These components are then linked to form various systems and analysed for steady-state and transient response under various loading conditions.

The chapter dealing with feedback systems is confined to the derivation of system equations and transfer functions, their physical interpretation and graphical representation. Response and stability criteria have been omitted since the general theory for this study is well expounded in many other books. With a knowledge of basic control theory and the techniques of Routh, Nyquist, Bode, Nichols and methods of improving system performance, an even deeper study of the behaviour of fluid power systems can be made.

My thanks are expressed to my colleagues at Leicester and to my students whose help and tolerance made this book possible.

Bernard Goodwin