Book Reviews

Engineering Circuit Analysis, second edition—William H. Hayt and Jack E. Kemmerly (New York: McGraw-Hill, 1971, 640 pp., $18.50, solutions manual and answer book). *Reviewed by G. H. Hostetter, H. J. Lane, and R. T. Stefani.*[1]

INTRODUCTION

When we adopted *Engineering Circuit Analysis* in 1972, our department's primary motivation for a textbook change was the desire for a clearer, more detailed coverage of such fundamental topics as resistive networks, transients, and phasor solutions.

We believe this text to be among the best available for a first course in network analysis. It is relatively free of preoccupation with collateral topics such as computer programs, signal flow graphs, state variables, and gyrators. Our students like using a text which is largely written to them rather than to the instructor.

The critical comments which follow are intended to be constructive and, most particularly, to be helpful to the beginning user of this text.

CHAPTER BY CHAPTER DISCUSSION

One must be very careful in pacing the class so that the first three chapters, on resistive circuits, do not occupy too large a share of the term. This tendency toward slow pacing is due in part to the large number of new ideas and concepts to which the beginning student is exposed. There is further contribution to this problem by the authors' dwelling upon such nonessentials (at the Ohm's law stage) as duality and by references to things which it is said will be explained in future chapters.

Pacing remains a problem in the chapters on transient analysis (Chapters 4–7). The separation of source-free and driven RL and RC network material into separate chapters seems quite artificial, especially since most of the source-free chapter's problems involve sources. This attempted distinction is confusing to many students and necessitates class discussion of much of the same material more than once.

We prefer to treat driven and source-free first-order networks with a single pass and would rather not emphasize the unit step function so much at this point. Modifications of this type in the presentation are not difficult, but they do require advance planning.

Chapters 9–11, on steady-state sinusoidal response are adequate when accompanied by sufficient drill in problem solution. Special care has been taken to present the phasor method logically and to relate rms values, average, and reactive power to the phasors.

Chapter 8 on sinusoidal functions, Chapter 9 which introduces the phasor concept, and Chapter 10 in which network solution methods are given might better be combined into one or two broader chapters. Students certainly can use many more examples of phasor networks solutions than are contained in Chapter 10.

If you really intend, as we do, to introduce three-phase power, Chapter 12 which addresses the topic is very inadequate. It is poorly motivated, compared to say, Skilling [1] or Smith [2]. The notation and terminology does not distinguish delta and wye quantities well.

Most important, the balance of coverage is poor. The delta-wye load transformation is not mentioned, and about one-third of the chapter is devoted to wattmeter connections, a concern which is not paralleled elsewhere for other measurements such as voltage and current.

Chapter 13, on "complex frequency" generalizes the impedance concepts presented previously in terms of phasors and discusses network natural frequencies. To this point, by and large, the organization of text topics has followed the logical trail mentioned by the authors in the preface. Here the trail begins to double back. Having left the discussion transients at the R-L-C network stage in order to jump into phasors before too many chapters have gone by, it is now necessary to return and extend the previous material.

There is a very pronounced shift in gears at Chapter 13 and it probably would be best to emphasize the change in viewpoint in class. If two terms are taken to complete the text, Chapter 13 is by far the best place to begin the second term.

The presentation of resonance and frequency response in Chapter 14 relies heavily on the pole-zero plots and rubber sheet visualization of the preceeding chapter. Emphasis is upon impedance magnitude functions; the phase function is hardly mentioned.

The wisdom of delaying discussion of coupled circuits to Chapter 15 is questionable. The advantages of joining the presentations of transformers and two-port parameters (Chapter 16) are obvious, but the delay necessitates backtracking to incorporate mutual coupling into the subject matter of several previous chapters.

The final chapters on Fourier series, Fourier transform, and Laplace transform are conventional and quite adequate to their usual purpose, which is to introduce the use of these methods for network solution.

PROBLEM ASSIGNMENTS

Our students are less than enthusiastic about some of the drill and chapter problems, many being of the opinion that additional, less involved exercises in many places would speed learning.

Answers for a set of drill problems are not necessarily in the same order as the problems themselves so that students often must work more than one problem in the set to be certain of the correctness of their answer.

CONCLUSION

There are always compromises to be made in ordering a year's material in a textbook that may or may not be used for the full year. The authors have chosen to introduce sinusoidal ($s = j\omega$) impedance quite a while before discussing the general, exponential case and they have delayed material on resonance and coupled circuits until relatively late in the text. Hence, not surprisingly, considerable review and repetition are necessary before the delayed subjects can be incorporated. Also, the subjects covered prematurely sometimes suffer from the distributed coverage.

REFERENCES

[1] H. H. Skilling, *Electrical Engineering Circuits*, 2nd Ed. New York: Wiley, 1965.
[2] R. J. Smith, *Circuits, Devices and Systems*, 2nd Ed. New York: Wiley, 1971.

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