

The book « Acoustics : sound fields and transducers » is both an old and a new book. It is a new edition of the famous « Acoustics » by Leo L. Beranek, edited for the first time in 1954. But the collaboration with Tim J. Mellow led to updates and supplements, both along the original chapters and by adding several new ones. This resulted in 695 pages instead of 478, although some topics of the previous editions have been discarded. Hence the new title, which rightly advertises a narrower focus. Indeed, the major part of the book is about loudspeakers - from drivers to radiation - although all facets of electroacoustics are still covered in the first chapters.

Conventional electroacoustic models provide efficient tools for engineers, and Leo L. Beranek's book was one of the most practical books allowing somebody with a good knowledge of electric engineering to analyze or design electroacoustic devices. The compensation for the models simplicity is double : first, they require a prior understanding of the basic phenomena involved into the device under study. Second, these electroacoustic models are built from lumped elements, preventing them to deal with 3D features such as the vibration of membranes, or the radiated acoustic field. At low frequencies, piston-like vibration is often an acceptable assumption, so the new book added emphasis on radiation, extensively covered with much computation details. Moreover, analytical descriptions are supplemented throughout the book, in closed-form expressions or matrix formulations. These are more suited for a computer implementation, thus needed to take full advantage of this new book content.

Chapter 1 and 2 are basics of Acoustics, including free traveling solutions in the three main separate coordinate systems. Chapters 3 and 4 describe the principle of electro-acoustic analogies, together with the basic components involved and usual ideal sources. Altogether, these four chapters (about 30% of the book) allow to grasp the minimum concepts of acoustics and eventually translate them into electrical circuits. They are close to the same chapters of the original book edition, updated to use SI units and recent conventions. A few topics have been discarded, replaced by a theoretical description of propagation in a lossy tube. The radiation impedance and directivity are introduced here, although they are covered in deeper details later on. Several examples allow to assimilate electroacoustic methods, following the quite pedagogic approach of the original book. A method for the implementation of electroacoustic network analysis has also been added in the last chapter (14) of the book.

Chapters 5 to 9 deal with transducers, *i.e.* their transduction principles, some technological aspects, and practical implementation (design, loads, coupling). Although a great part of this was covered in the previous edition, this material has been significantly updated : it adopts today's parameters and conventions, examples deal with recent technologies, including miniature devices for mobile phones. Again, charts are replaced or supplemented by expressions suitable for computer use, and modern design methodology is emphasized. Altogether, these four chapters (about 40% of the book) allow somebody to analyze or design many modern sound sources, if sufficient effort has been invested to master the basics presented in the first chapters.

Chapters 10 and 11 deal with the 3D acoustic field into enclosures (modal approach) or rooms (statistical approach). These chapters recall briefly basic notions which have been given much less emphasis compared to the original edition. Still, most important concepts are presented, avoiding the need for another resource.

Chapter 12 and 13 are a major supplement (about 25% of the book) dealing with radiation, from surface impedance to directivity, and including some nearfield analysis. Chapter 13 is somewhat a compilation of recent papers by one of the authors, based on analytical or semi-analytical solutions for various radiation conditions. Although still academic, these cases allow to understand the major trends behind radiation, illustrated by numerous charts. Several methods are detailed to manage these calculations. More than average mathematical skills are however required to be able to adapt them to new problems. For a reader not affording such an effort, this chapter allows to outline a basic classification of radiation situations from which practical cases may be approximately dealt with.

Altogether, « Acoustics : sound fields and transducers » may be considered as a valuable book for many readers, ranging from undergraduate to PhD students and professional workers. A 16 page errata is provided on the web site of the author, a valuable help for someone intending to implement the models described in the book. Successive readings may be needed before the extended analytical content can be applied to practical cases, but this main objective of the first edition is still valid for the present one.

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