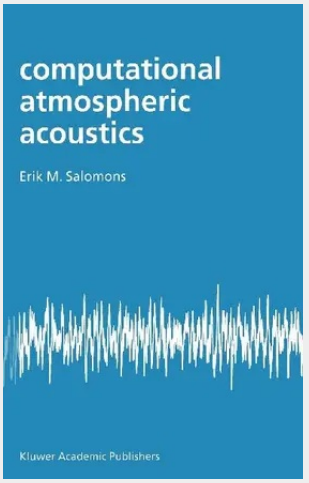
Salomons

Computational Atmospheric Acoustics



Noise from cars, trains, and aeroplanes can be heard at large distances from the source. Accurate predictions of the loudness of the noise require accurate computations of sound propagation in the atmosphere. This book describes models that can be used for these computations. The models take into account complex effects of the atmosphere and the ground surface on sound waves, including the effects of wind and temperature distributions, atmospheric turbulence, irregular terrain, and noise barriers.
The main text of the book focuses on physical effects in atmospheric acoustics. The effects are illustrated by many numerical examples. The main text requires a very limited mathematical background from the reader; detailed mathematical descriptions of the models, developed from the basic principles of acoustics, are presented in appendices. Models for moving media are compared with models that are based on the effective sound speed approach. Both two-dimensional models and three-dimensional models are presented. As meteorological effects play an important role in atmospheric acoustics, selected topics from boundary layer meteorology and the theory of turbulence are also presented.

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106,99 €
99,99 € (zzgl. MwSt.)

Lieferfrist: bis zu 10 Tage

Artikelnummer: 9780792371618
Medium: Buch
ISBN: 978-0-7923-7161-8
Verlag: Springer
Erscheinungstermin: 31.08.2001
Sprache(n): Englisch
Auflage: 1. Auflage 2001
Produktform: Gebunden
Gewicht: 1480 g
Seiten: 335
Format (B x H): 160 x 241 mm

Kundenservice Verlag Dr. Otto Schmidt KG
Neumannstraße 10, 40235 Düsseldorf | kundenservice@otto-schmidt.de | 0221-93738-997 (Inland)