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Autore	Meirmanov Anvarbek
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Descrizione fisica	1 online resource (xxxviii, 449 pages) : illustrations (some color)
Collana	Atlantis Studies in Differential Equations, , 2214-6261 ; ; 1
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Soggetti	Differential equations Mathematical physics Mechanics Differential Equations Mathematical Methods in Physics Classical Mechanics
Lingua di pubblicazione	Inglese
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Note generali	"ISSN: 2214-6253."
Nota di bibliografia	Includes bibliographical references.
Nota di contenuto	Isothermal Liquid Filtration -- Filtration of a compressible thermo-fluid -- Hydraulic shock in incompressible poroelastic media -- Double porosity models for a liquid filtration -- Filtration in composite incompressible media -- Isothermal acoustics in poroelastic media -- Non-isothermal acoustics in poroelastic media -- Isothermal acoustics in composite media -- Double porosity models for acoustics -- Diffusion and convection in porous media -- The Muskat problem.
Sommario/riassunto	The book is devoted to rigorous derivation of macroscopic mathematical models as a homogenization of exact mathematical models at the microscopic level. The idea is quite natural: one first must describe the joint motion of the elastic skeleton and the fluid in pores at the microscopic level by means of classical continuum mechanics, and then use homogenization to find appropriate approximation models (homogenized equations). The Navier-Stokes equations still hold at this scale of the pore size in the order of 5 – 15 microns. Thus, as we have mentioned above, the macroscopic mathematical models obtained are still within the limits of physical applicability. These mathematical models describe different physical

processes of liquid filtration and acoustics in poroelastic media, such as isothermal or non-isothermal filtration, hydraulic shock, isothermal or non-isothermal acoustics, diffusion-convection, filtration and acoustics in composite media or in porous fractured reservoirs. Our research is based upon the Nguetseng two-scale convergent method.

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