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2.2. Comments on techniques for micro-macro upscaling2.2.1. Homogenization techniques for separated length scales; 2.2.2. The ideal homogenization method; 2.3. Statistical modeling; 2.4. Method of multiple scale expansions; 2.4.1. Formulation of multiple scale problems; 2.4.1.1. Homogenizability conditions; 2.4.1.2. Double spatial variable; 2.4.1.3. Stationarity, asymptotic expansions; 2.4.2. Methodology; 2.4.3. Parallels between macroscopic models for materials with periodic and random structures; 2.4.3.1. Periodic materials; 2.4.3.2. Random materials with a REV
2.4.4. Hill macro-homogenity and separation of scales2.5. Comments on multiple scale methods and statistical methods; 2.5.1. On the periodicity, the stationarity and the concept of the REV; 2.5.2. On the absence of, or need for macroscopic prerequisites; 2.5.3. On the homogenizability and consistency of the macroscopic description; 2.5.4. On the treatment of problems with several small parameters; Chapter 3. Homogenization by Multiple Scale Asymptotic Expansions; 3.1. Introduction; 3.2. Separation of scales: intuitive approach and experimental visualization
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3.4. Expressing problems within the formalism of multiple scales

Sommario/riassunto

Both naturally-occurring and man-made materials are often heterogeneous materials formed of various constituents with different properties and behaviours. Studies are usually carried out on volumes of materials that contain a large number of heterogeneities. Describing these media by using appropriate mathematical models to describe each constituent turns out to be an intractable problem. Instead they are generally investigated by using an equivalent macroscopic description - relative to the microscopic heterogeneity scale - which describes the overall behaviour of the media. Fundamental que