Complex Fluids

Component
École Nationale Supérieure d'Électrotechnique d'Électronique

In brief

- **plugin.odf-inp:PLUGINS_ODF_COURSE_NBHOURS_TXT:** 17,5
- **Code ELP:** N7EM01A

Presentation

Objectives

Knowing and mastering the key concepts of Complex Fluids.

Description

1 / Introduction- examples of applications 5 major types of complex fluids: thixoptropic, antithixotropic, pseudoplastic, dilatant, threshhold Effect of the difference of normal stresses: Weissemberg effect, ... Examples, applications, relation with the microstructure, formulation of industrial fluids and environmental fluids. Notion of relaxation time, phase transition, glass transition, compatible and incompatible mixtures
2 / PhenomenologyThe mechanical analog models: Kelvin, Maxwell, Burger, ...Kelvin generalized, Maxwell generalized
3 / Entropic elasticity. Rubber elasticity, Langevin's equation
4 / Mechanics of complex fluids. Behavioral laws and momentum conservation equation: objectivity, Reiner-Rivlin fluids, generalized Newtonian fluids, pseudoplastic fluids (plug flow), Eulerian elasticity notion, corotational and convected Maxwell models (Oldroyd-B), single integral models (Lodge, Wagner, ..)
5 / Molecular models Rouse model (polymer in solution) Fractality and self - similar behavior - modeling6 / Experimental rheology. Rheometries plan-plan, cone-plan, Couette, capillary, elongational

Pre-requisites

Non-contractual information.
Last update on 18 December 2024

Continuous medium mechanics

Meca Fluides 1

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