

# METHOD OF STRAIGHT LINES FOR A BINGHAM PROBLEM AS A MODEL FOR THE FLOW OF WAXY CRUDE OILS

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ABSTRACT. In this work, we develop a method of straight lines for solving a Bingham problem that models the flow of waxy crude oils. The model describes the flow of mineral oils with a high content of paraffin at temperatures below the cloud point (i.e. the crystallization temperature of paraffin) and more specifically below the pour point at which the crystals aggregate themselves and the oil takes a jell-like structure. From the rheological point of view such a system can be modelled as a Bingham fluid whose parameters evolve according to the volume fractions of crystallized paraffin and the aggregation degree of crystals. We prove that the method is well defined for all times, a monotone property, qualitative behaviour of the solution, and a convergence theorem. The results are compared with numerical experiments at the end of this article.

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