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Huseyin Coskun* (hcoskun@math.uiowa.edu), University of Iowa, Department of Mathematics, 14 MacLean Hall, Iowa City, IA 52242. *A Continuum Model with Free Boundary Formulation and the Inverse Problem for Ameboid Cell Motility.*

In this article a mathematical model for ameboid cell movements using viscoelastic fluid dynamics with free boundary formulation is introduced.

Based on the model, the inverse problem can be posed: depending on the constitutive relations and governing equations, what kind of characteristic properties must the model parameters and unknowns have in order to reproduce a given movement of the cell, provided that the velocity field and moving boundaries are given? Primarily, this inverse problem is formulated and discussed in this paper.

The inverse problem provides the model parameters that give some insight, principally into the mechanical aspect, but also, through qualitative reasoning, into chemical and biophysical aspects of the cell. Some numerical analysis and results of the inverse problem is also discussed. (Received September 12, 2005)