



## FMRC Fluid Mechanics Seminar Series

# Viscoelastic simulation of polymer flow – the KBKZ model; history, theory, and application

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**Abstract:** Polymers (plastics) are viscoelastic materials, combining effects of viscosity and elasticity. When they flow inside processing equipment, they show unusual behaviour not seen in Newtonian fluids (like water). Their non-Newtonian behaviour is best described by sophisticated integral rheological constitutive equations of the K-BKZ type (initials of Kaye-Bernstein-Kearsley-Zapas) based on rubber elasticity. This model has now been around for 50 years (since 1963) and it has been used in many polymeric liquid flows and processes with considerable success.

The present talk will focus on its initial development, the theory behind it, and how it uses experimental rheological data to fit the model parameters, including relaxation moduli, shear viscosity, normal stresses, and extensional viscosity. Then a number of applications from rheology, rheometry, and polymer processing will be given, where the model has been found to be particularly successful in its predictions in simulations.

**Biography:** 1998-now, Full Professor at School of Mining Eng. & Metallurgy, National Technical University of Athens, Athens, Greece  
1984-1999 Assistant, Associate and Full Professor at Dept. Chem. Eng., University of Ottawa, Ontario, Canada  
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