SEMINARIO DE ANÁLISIS NUMÉRICO Y MODELACIÓN MATEMÁTICA

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Mathematical and numerical aspect of a rigid-rod model for proteins polymers

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Resumen

Here we present a work where we introduce a new brand model for polymerization-fragmentation of polymers, formed from proteins, under flow. Polymers are modeled by rigid rods, such as in and described according to a configurational density, with respect to size-orientation and position, meanwhile proteins are supposed to be spherical and described by a density function following an advection-diffusion equation. Equation on polymers takes into account the lenghtening of polymer due to protein polymerization and the fragmentation of polymers into smaller pieces. This model is studied in a weighted space, where existence of solutions is proved. This original space differs from classical studies of polymerization-fragmentation equations, and proposes a new point of view for these problems. Next, we introduce an original numerical scheme, for a particular given flow, as a first step ahead. Finally, we discuss on the several possible applications and developments both in biology and mathematics.