ÉCOLE POLYTECHNIQUE
FÉDÉRALE DE LAUSANNE

B. Buffoni – B. Dacorogna – J. Krieger - H.M Nguyên - Section Mathématiques

SEMINAIRE D'ANALYSE

➢ ***JEUDI 5 JUIN 2014 à* 14h15 - *salle MA A3 31***

Professeur ***MOSHE MATALON*** *(*Université de l'Illinois, Urbana, USA) donnera une conférence sur le thème:

«On overview of asymptotic methods in combustion theory»

Combustion systems involve the entire gamut of complexities associated with multi-component flows, heat and mass transfer, and chemical reactions, further complicated by the multidimensional and time-dependent nature of the flow, which in most applications is turbulent. Such processes, however, occur over a wide range of temporal and spatial scales. The chemical reactions occurring in mixtures commonly used in combustion devices evolve over time scales that are relatively short compared to the flow or diffusion time scales, which imply that the chemical activity is confined to thin reaction layers. The reaction zones are embedded in the broader flame, where diffusion, heat conduction and viscous dissipation take place, and is normally a fraction of a millimeter compared to the much larger hydrodynamic length scale. And on a yet larger scale, there may be nonlinear interactions with the acoustic field generated, for example, at the combustor's inlet. Resolving such problems, in a way that faithfully represents the underlying physicochemical processes on all scales, small and large, is computationally intensive and not feasible in the near future. It is not surprising therefore that the techniques of asymptotic analysis are the primary tools that have been used by theorists to successfully analyze flame problems. In this overview I will present some of the ideas that have been used to tackle increasingly complex problems, from the propagation of a premixed laminar flame, to multi-dimensional flames and finally turbulent flames.

Lausanne, le 28 mai 2014
BD/cr

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