



ΕΘΝΙΚΟ ΜΕΤΣΟΒΙΟ ΠΟΛΥΤΕΧΝΕΙΟ
ΣΧΟΛΗ ΧΗΜΙΚΩΝ ΜΗΧΑΝΙΚΩΝ

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ΣΕΜΙΝΑΡΙΟ ΧΗΜΙΚΗΣ ΜΗΧΑΝΙΚΗΣ

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Modeling of atomization processes in fuel injection systems

Atomization, or liquid breakup mechanisms are utilized in numerous applications. One of the most common applications of these phenomena is in fuel injection systems. Liquid fuel is injected into an ambient air, to prepare a combustible mixture. Generally, evenly spread tiny fuel droplets are desirable. This is usually achieved through multiple liquid breaking mechanisms: Primary breakup of liquid jet, Secondary breakup of travelling liquid droplets, and Secondary breakup of wall-impinging liquid droplets.

While the vast majority of existing models for these mechanisms assume stationary conditions (e.g. constant liquid travel velocity, constant liquid temperature, etc.), it will be demonstrated that in modern fuel injection applications these transient conditions cannot effectively be assumed away. Some currently developed analytical modelling approaches to different atomization mechanisms, in which transient effects are featured, will be presented and discussed.