The role of Mathematical Models and Model Reduction in the Design of Coronary Stents

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Abstract :

In this talk, I will illustrate the critical role of Mathematical Models in the understanding, design and optimization of coronary stents.
Stents are devices intended to reopen a coronalry occlusion that may lead to infarct. After the first implantation in humans at the end of the Seventies, design of stents has improved significantly mainly thanks to in vitro and in vivo studies. At the current level of sophistication, more accurate and rigorous mathematical models for the hemodynamics are needed for the next significant improvements and for avoiding market failures like bioresorbable stents. Established and more recent approaches, like the ones introduced by model reduction, can provide the breakthrough to improve coronary disease therapy, together with accurate data assimilation procedures to enable in silico clinical trials. In this talk, I will report my experience at Emory, GA Tech and North East Georgia Healthcare during the last 10 years.
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