

ATHENA VISUAL STUDIO

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A Novel, Non-Conventional and Fully Integrated Approach to Process Modeling, Parameter Estimation and Optimization in Science and Engineering.

As an engineer or scientist in a manufacturing facility, researcher in a pilot plant or laboratory, graduate or undergraduate student, you frequently come face to face with some of the most challenging tasks of science and engineering: the mathematical modeling of an existing or conceptualized process, and the estimation of the unknown chemical and physical parameters that you have decided to include in the model or models you are about to investigate.

Suddenly your small world becomes a complicated and unfriendly place. Unless you happen to be an expert on all phases of your task, and I mean deriving the models, solving efficiently and with success the underlying mathematical equations, designing an optimal set of experiments to gather supporting evidence, estimating the unknown parameters in your models and discriminating, if needed, amongst rival models, you will be faced with the daunting task of selecting the appropriate tools to produce, gather and analyze the information needed to carry out your modeling project. So you start sorting through software and find one to solve your models, another to estimate your model parameters, and yet another to design a good set of experiments; in addition you begin to look for physical property data, thermodynamic methods to describe the state of the mixtures you are dealing with, and the list goes on and on... If you are like most scientists or engineers, you also start looking at previous works of your peers and talking to some of your friends and colleagues asking for advice. Soon you realize that there is a myriad of choices regarding how to write models of chemically reactive and non-reactive systems, what software to use to solve the models and estimate parameters, what language to use to write your models, how easy it is, how much money you have to spend if you need to purchase any software tools, what training is required to use all the tools that you have gathered and the list goes on and on...

If all these sound too familiar then I invite you to experience ATHENA VISUAL STUDIO, a unique software that offers an integrated environment for the modeling, estimation, optimal experimental design, model discriminating and graphical interpretation of chemically reactive and non-reactive systems. ATHENA VISUAL STUDIO gives the user the freedom to develop his or her own models, but alleviates the tasks associated with solving the underlying equations and estimating the model adjustable parameters. In this sense, it offers an advanced graphical user interface to a set of powerful solvers for the robust and efficient handling of lumped and distributed parameter systems both dynamic and steady-state. In addition, it offers an easy, direct and seamless link of all these systems with powerful pa-

parameter estimation and optimization software, which allows for the analysis of single, and multi-response experiments, model discrimination and optimal experimental design. A large number of graphical capabilities allow the users to interpret and disseminate the acquired information in a useful and effective manner.