

# **ATHENA VISUAL STUDIO**

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## **A Novel, Non-Conventional and Fully Integrated Approach to 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.



You decide to begin your project. Suddenly your world becomes a complicated and unfriendly place. Unless you happen to be an expert on all phases of your task, deriving the models, solving the mathematical equations efficiently and successfully, designing an optimal set of experiments, gathering supporting evidence, estimating the unknown parameters in your models, and discriminating 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. You 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 being dealt with, and a whole host of other necessities. If you are like most scientists and engineers, you will also begin looking at and discussing the works of your peers around you. Soon you realize that there is a myriad of choices regarding how to write models of chemical systems, what software to use to solve the models and estimate parameters, and what language to write your models in. How easy is it? How much money you have to spend on the appropriate tools? What training will be required to use said tools? It can be overwhelming.

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. It offers an advanced graphical 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 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.