

Title: Computer experiments: a cursory review of recent development
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Abstract: Complex system/product simulations are ubiquitous in engineering and scientific investigations. Often the values of the inputs of the simulations are up to choice such as in mechanical or material designs. Then the problem can be viewed as that design and analysis of computer experiments, as opposed to physical experiments. The latter has been the mainline of work in experimental design since Fisher's pioneering work. Research on computer experiments has taken off in the last decade. In this talk I will focus on the three key aspects of computer experiments: design, modeling and analysis, and computations. In modeling there are two broad approaches: stochastic (via the method of kriging), and numeral. Choice of the two approaches is intertwined with the issues of computational stability and inferential capability. As illustrations, I will mention recent research in three areas: (i) integration of high- and low-accuracy simulations, including low and high mesh densities in finite element analysis, (ii) kriging with both quantitative and qualitative factors, (iii) nested and sliced space-filling designs.