

Rare event analysis in technological catastrophes

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Abstract

One of the main tasks when dealing with critical systems (systems where specific classes of failures can deal to human losses, or to huge financial losses) is the ability to quantify the associated risks, which is the door that, when opened, leads to paths towards understanding what can happen and why, and towards capturing the relationships existing between the different parts of the system, with respect to those risks. This is also the necessary preliminary work allowing to evaluate the relative importance of different factors with respect to the analyzed risks, an important component of any disaster management system. Identifying the dominant ones is important to know which parts of the system we must reinforce. The talk will describe through examples different tools available for these tasks, and how they are used depending on the objectives to reach. The focus will be on Monte Carlo techniques, the only available ones in general, because the only ones able to evaluate any kind of system, and how they deal with rare events. We will also discuss the main related open research problems.