

de Rocquigny, Étienne**Mastering uncertainty in industry. II: A survey of physical and numerical statistical modelling methods. (La maîtrise des incertitudes dans un contexte industriel. II. Revue des méthodes de modélisation statistique physique et numérique.)** (French. English summary)[Zbl 1409.62257](#)[J. Soc. Fr. Stat. 147, No. 3, 73-106 \(2006\).](#)

Summary: A generic and applied approach to uncertainty, derived from years of industrial practice in different sectors, and aiming at giving a consistent and industrially-realistic framework for practical mathematical modelling of quantitative uncertainty, has been introduced in a previous paper [the author, *ibid.* 147, No. 3, 33–71 (2006; [Zbl 1409.62256](#))]. It involves in particular the proper identification of key steps such as the quantification (or modelling) of the sources of uncertainty (step B), possibly involving an inverse approach (B'), their propagation through a pre-existing physical-industrial model (step C), the ranking of importance or sensitivity analysis (step C') and sometimes a subsequent optimisation step. Within this framework various mathematical settings are possible: however, the mixed deterministic-probabilistic setting appears to be central in present industrial applications. An integrated introduction is made henceforth to the subsequent statistical modelling and scientific computing issues. Choosing the most relevant corresponding mathematical methods, that closely blend applied mathematics and physical-industrial analysis, is shown to depend firstly on the specific goal assigned to the uncertainty study. It is related to the applicable regulation and standards and particularly the relevant quantity of interest and decision criterion (step A), more than to the specific physical-industrial domain. Starting from the review of the state-of-the-art of industrial practice, an identification of several open challenges and of the research fields of highest priority is proposed in the view of the very numerous industrial applications bound to come.

MSC:

62P30 Applications of statistics in engineering and industry; control charts

62-02 Research exposition (monographs, survey articles) pertaining to statistics

Software:[bootstrap](#); [TAPENADE](#)**References:**

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