

Higdon, Dave; Nakhleh, Charles; Gattiker, James; Williams, Brian

A Bayesian calibration approach to the thermal problem. (English) Zbl 1388.80005
Comput. Methods Appl. Mech. Eng. 197, No. 29-32, 2431-2441 (2008).

Summary: Many of the problems we work with at Los Alamos National Laboratory are similar to the thermal problem described in the tasking document. In this paper, we describe the tools and methods we have developed that utilize experimental data and detailed physics simulations for uncertainty quantification, and apply them to the thermal challenge problem. We then go on to address the regulatory question posed in the problem description. This statistical framework used here is largely based on the approach of *M. C. Kennedy* and *A. O'Hagan* [J. R. Stat. Soc., Ser. B, Stat. Methodol. 63, No. 3, 425–464 (2001; [Zbl 1007.62021](#))], but has been extended to deal with functional output of the simulation model.

MSC:

- 80M25 Other numerical methods (thermodynamics) (MSC2010)
- 80-05 Experimental work for problems pertaining to classical thermodynamics
- 62P35 Applications of statistics to physics

Cited in **12** Documents

Keywords:

computer experiments; predictability; certification; uncertainty quantification; Gaussian process; predictive science; functional data analysis; verification and validation

Software:

[fda](#) (R)

Full Text: [DOI](#)

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