

Antoine Ajenjo, Emmanuel Ardillon, Vincent Chabridon, Scott Cogan and Emeline Sadoulet-Reboul, 2020, Robustness evaluation of reliability assessments of penstocks using info-gap method, 30th European Safety and Reliability Conference, ESREL 2020 and 15th Probabilistic Safety Assessment and Management Conference, PSAM 2020, Venice, Virtual, 1–5 November 2020, Pages 4784 - 4790, 169730. Edited by Piero Baraldi, Francesco Di Maio and Enrico Zio.

Abstract In order to predict the real-world performance of a system, it is necessary to represent in the best manner possible its parameters, its environment and the mathematical or numerical model that associates its performance to a set of inputs. In most industrial cases, a perfect knowledge of all phenomena at stake is not available. It is necessary in such cases to guarantee the performance of the system in an uncertain context. One way to do so is to evaluate the robustness of the model defined as the maximum error that can be applied to the model for which an acceptable performance is still ensured. The info-gap method quantifies such robustness by using nested convex uncertainty models. Throughout this paper, the method is applied to evaluate the robustness of a reliability-based model used for assessing the mechanical strength of penstocks. The different steps enabling the quantification of this robustness are presented as well as the information that can be obtained from these results. ©ESREL2020-PSAM15 Organizers. Published by Research Publishing, Singapore.

Keywords Structural reliability, info-gap, robustness, penstocks, surrogate models, optimization.