

Info-gap Theory and its Applications in Engineering Modelling & Design

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22 July 2010, Institute of Industrial Science, The University of Tokyo

Abstract

Info-gap theory is a method for analysis, planning, decision and design under uncertainty. The future may differ from the past, so our models may err in ways we cannot know. Our data may lack evidence about surprises: catastrophes or windfalls. Our scientific and technical understanding may be incomplete. These are info-gaps: incomplete understanding of the system being managed. Info-gap theory provides decision-support tools for modelling and managing severe uncertainty. After outlining the info-gap methodology, we explore several applications to engineering modelling and design.

Outline

- Principle of Indifference
- Info-Gap Robust-Satisficing
- Simple Robustness Examples
- Spring Design with Uncertain PDF
- System Identification

Selected Publications

- Yakov Ben-Haim, 2006, *Info-Gap Decision Theory: Decisions Under Severe Uncertainty*, 2nd edition, Academic Press, London.
- Yakov Ben-Haim, 2004, Uncertainty, probability and information-gaps, *Reliability Engineering and System Safety*, 85: 249–266.
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- Yakov Ben-Haim, 2010, *Info-Gap Economics: An Operational Introduction*, Palgrave.
- Yakov Ben-Haim, 1996, *Robust Reliability in the Mechanical Sciences*, Springer-Verlag, Berlin.
- David R. Fox, Yakov Ben-Haim, Keith R. Hayes, Michael McCarthy, Brendan Wintle, Piers Dunstan, 2007, An info-gap approach to power and sample size calculations, *Environmetrics*, vol. 18, pp.189–203.
- Yakov Ben-Haim, 2009, Info-gap forecasting and the advantage of sub-optimal models, *European Journal of Operational Research*, 197: 203–213.
- Sary Regev, Avraham Shtub and Yakov Ben-Haim, 2006, Managing project risks as knowledge gaps, *Project Management Journal*, vol. 37, issue #5, pp.17–25.
- Izuru Takewaki and Yakov Ben-Haim, 2005, Info-gap robust design with load and model uncertainties, *Journal of Sound and Vibration*, 288: 551–570.

Additional information: <http://info-gap.com>