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Survival Under Uncertain Competition: Info-Gap Applications to Ecology and Conservation

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 ecology and biological conservation.

Outline

- Info-gap uncertainty and the principle of indifference
- Info-gap robust-satisficing foraging
- Is non-probabilistic robustness a good probabilistic bet?
- Applications of info-gap theory

Selected Publications

- Yakov Ben-Haim, 2006, *Info-Gap Decision Theory: Decisions Under Severe Uncertainty*, 2nd edition, Academic Press, London.
- Yakov Ben-Haim, 2010, *Info-Gap Economics: An Operational Introduction*, Palgrave.
- John K. Stranlund and Yakov Ben-Haim, 2008, Price-based vs. quantity-based environmental regulation under Knightian uncertainty: An info-gap robust satisficing perspective, *Journal of Environmental Management*, 87: 443–449.
- Helen M. Regan, Yakov Ben-Haim, Bill Langford, Will G. Wilson, Per Lundberg, Sandy J. Andelman, Mark A. Burgman, 2005, Robust decision making under severe uncertainty for conservation management, *Ecological Applications*, vol.15(4): 1471-1477.
- Yohay Carmel and Yakov Ben-Haim, 2005, Info-gap robust-satisficing model of foraging behavior: Do foragers optimize or satisfice?, *American Naturalist*, 166: 633–641.
- Atte Moilanen, Michael C. Runge, Jane Elith, Andrew Tyre, Yohay Carmel, Eric Fegraus, Brendan Wintle, Mark Burgman and Yakov Ben-Haim, 2006, Planning for robust reserve networks using uncertainty analysis, *Ecological Modelling*, vol. 199, issue 1, pp.115–124.
- Atte Moilanen, Astrid van Teeffelen, Yakov Ben-Haim and Simon Ferrier, How much compensation is enough? A framework for incorporating uncertainty and time discounting when calculating offset ratios for impacted habitat, *Restoration Ecology*, vol. 17, #4, pp.470–478.
- M.A. Burgman, B.A. Wintle, C.A. Thompson, A. Moilanen, M.C. Runge, and Yakov Ben-Haim, 2009, Reconciling uncertain costs and benefits in Bayes nets for invasive species management, *Risk Analysis*, vol. 30, #2, pp.277–284.
- Lior Davidovitch, Richard Stoklosa, Jonathan Majer, Alex Nietrzeba, Peter Whittle, Kerrie Mengersen and Yakov Ben-Haim, 2009, Info-Gap theory and robust design of surveillance for invasive species: The case study of Barrow Island, *Journal of Environmental Management*, vol. 90, Issue 8, pp.2785–2793.
- Yemshanov, Denys, Frank H. Koch, Yakov Ben-Haim and William D. Smith, 2010, Detection capacity, information gaps and the design of surveillance programs for invasive forest pests, *Journal of Environmental Management*, 91: 2535–2546.

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