Info-gap Theory: Why Ecologists Should Care

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Abstract

Three ideas underlie this talk:

¶ **Uncertainty is not necessarily probabilistic.** The domain of epistemic uncertainty is broader than the scope of probability theory. We discuss the limitations of the principle of indifference (principle of maximum entropy). We examine the Shackle-Popper indeterminism of intelligent learning systems.

¶ **Uncertainty-thinking has evolved**, and we currently are at an innovative juncture. We consider four stages in the development of reasoning and uncertainty:

- Deductive reasoning (ancient Greece).
- Forward (predictive) probability (17th c.)
- Reverse (inferential) probability (18th c.)
- Modern high-speed decision making (since early 20th c).

¶ **Information-gap decision strategies** provide a useful tool for design and planning under severe uncertainty.

- Robust satisficing:
  - Satisficing: doing good enough.
  - Maximize immunity against failure.
- Opportune windfalling:
  - Windfalling: facilitating wild dreams.
  - Minimize immunity against windfall.

¶ **Illustration.** We discuss a simple park-management example.