



The role and value of information in decision making

Organizers:

Dr. Dmitry Gromov, Senior researcher, Department of mathematics, University of Latvia, and Institute for Chemistry and Biology of Marine Environments (ICBM), Carl von Ossietzky University Oldenburg, Email: gromov@lu.lv

Description:

Information is crucial in decision-making, as it provides the foundation for making well-informed choices. The quantity, quality, and relevance of available information directly impact the effectiveness of decision-making. This becomes particularly significant in theoretical and model based decision-making scenarios, where uncertainties are inherent. Models, by nature, are incomplete representations of the real-life processes, which are subject to uncertainties—whether structural or parametric—, and information helps to reduce these uncertainties, enhancing model reliability and decision quality. However, not all information is equally valuable; at times, the costs of acquiring additional information can surpass its potential benefits. Consequently, it is essential to assess the expected gains from reducing uncertainty. The benefit derived from reducing or eliminating uncertainty before making a decision is quantified by a metric known as the Value of Information (VoI). This characteristic allows decision-makers to weigh the value of new information against the costs of acquiring it, thus ensuring resources are allocated effectively.

The described problems are located at the intersection of several fields of applied mathematics: statistics, information theory, uncertainty quantification, optimization as well as numerical modelling and analysis. Thus, the scope of the proposed section is rather broad, but at the same time centred around two main concepts: information and decision-making.