Hamilton Institute

Decision-making under statistical uncertainty

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Abstract:
Statistical decision-making procedures are used in a wide range of applications from communication receiver design to environment monitoring systems and drug-testing. Most conventional approaches are based on the unrealistic assumption that the underlying probabilistic model is known accurately. In this talk, we consider the setting where there is inherent uncertainty in the probabilistic model. We study three different problems and present specific approaches to deal with statistical uncertainty in each of these cases.

First, we consider the problem of universal hypothesis testing where we show how partial knowledge about the uncertain statistics can be exploited to improve detection performance. Next, we consider the quickest change detection problem where we show that designing for least favorable distributions ensures robustness to uncertainty about the observation statistics. Finally, we study the problem of dynamic spectrum access in cognitive radio systems where we combat uncertainty by learning the unknown system parameters. This online learning procedure significantly improves system performance over the worst- case design.

Venue: Seminar Room, Hamilton Institute, Rye Hall,
NUI Maynooth

Time: 2.00 - 3.00pm (followed by tea/coffee)

Travel directions are available at www.hamilton.ie

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