Round Table

What are imprecise probabilities good for ?

Lindley Bayesian credo

- measurements of uncertainty must obey the rules of the probability calculus. Other rules, like those of fuzzy logic or possibility theory, dependent on maxima and minima, rather than sums and products, are out.

- A fine critique is Walley (1991), who went on to construct a system that uses a pair of numbers, called upper and lower probabilities, in place of the single probability. The result is a more complicated system. My position is that the complication seems unnecessary.

Bayesian credo

- My position is that the complication seems unnecessary.
- I have yet to met a situation in which the probability approach appears to be inadequate and where the inadequacy can be fixed by employing upper and lower values.
- The pair is supposed to deal with the precision of probability assertions; yet probability alone contains a measure of its ownprecision.
- I believe in simplicity; provided that it works, the simpler is to be preferred over the complicated, essentially Occam's razor.

D. Lindley, The philosophy of statistics
The Statistician **(2000)** 49**,** Part **3,** pp. **293-337**

Some hints

- IP separates uncertainty due to lack of information and uncertainty due to variability while the variance of a single distribution does not make the difference: e.g. interval data

- IP enables to model the scarcity of data, exploiting confidence intervals in the form of sets of probabilities compatible with the data

- In learning processes, IP enables the improvement of precision as probability intervals that shrink as more data come in.