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Programming languages can do more! Coding beliefs, aims and explanations through types

Abstract:

Programming languages are not only instruments for implementing models, analysing large data sets and performing numerical simulations. Dependent types -- types that can depend on values -- provide enough expressive power to explain and communicate domain-specific notions, put forward beliefs and working hypothesis and specify aims or challenges. In contrast to mathematical formulations, formulations written in dependently typed programming languages (DTLs) can be machine checked. Thus, computers can assist in developing new theories. I walk you through a few examples and give you an overview on where we stand in applying DTLs to decision making under uncertainty and policy advice.