Waikato Management School
Te Raupapa

THE UNIVERSITY OF WAIKATO
Te Whare Wānanga o Waikato

Formulating Robust Management Strategies under Parametric Uncertainty in Bioeconomic Models

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Abstract
A common problem in bioeconomic modeling is parameter uncertainty. Inaccurate specification of coefficients can lead to false or distorted findings. Moreover, definition of point estimates is particularly tenuous given the heterogeneity and dynamic nature of most economic and natural systems. This seminar introduces a pragmatic computational framework for the consideration of parametric uncertainty in mathematical programming problems. In contrast to previous approaches, this formulation allows the exogenous control of conservatism, does not increase model size upon transcription, allows any coefficients to be treated as ambiguous, can be solved using standard software packages, and is easily extended to any form of constrained optimization. The robust approach is contrasted against results from deterministic analysis for a range of policy and production applications. Results from robust optimization do not suffer from the curse of false certainty, and therefore have greater general applicability and relevance for both extension and policy. The technique is demonstrated to have merit in many situations, except where a deterministic model is inherently stable with regard to nominal data perturbation.

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