

Uncertainty and Stability of Land Use Models: A first order approximation for CUBE LAND

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Abstract

In this work we focus on understanding the effects of the uncertainty of inputs and parameters of the Cube Land's model, a Land Use model based on the Random Bidding and Supply Model (RB&SM) (Martínez and Henríquez, 2007). This model consists of the equilibrium in the real estate demand and supply submodels, within which household and firm clusters bid for the available locations. The demand is assigned in an auction market, where the location and rents are defined.

We explore the sensitivity of the Cube Land model by reformulating the problem as a non-linear optimization problem, which at the optimum proves to be equivalent to the model without constraints. We apply a first order analysis, based on Fiacco's Sensitivity theorem (Fiacco, 1983), and we compare the results of the approximation with that obtained by applying the same perturbations on the model. The tests are made by running Cube Land over the city of Boston for the year 2010.

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