

Investigating the Braess Paradox within the 'User Equilibrium with Recourse' modelling framework

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Abstract

User equilibrium with recourse (UER) is a static traffic assignment equilibrium model. The model accounts for the adaptive behaviour of users when provided additional information en-route within a transport network. Similar to the traditional deterministic user equilibrium (DUE) model, this equilibrium model analytically exhibits what is known as the "Braess Paradox". The paradox suggests that adding a new link between an origin and destination pair increases the travel cost for each network user. The physical presence of the paradox forces planning authorities to re-evaluate the need for transport infrastructure projects and is fundamental in developing sustainable transport systems. The following paper discusses experimental methodology which can be used to investigate empirically the Braess Paradox phenomenon presented within the UER modelling framework. The development of the methodology is based on a review of literature which has investigated alternate forms of the Braess Paradox using controlled laboratory experiments.