ABSTRACT: The user equilibrium (UE) traffic assignment is a cornerstone in travel forecasting and traffic impact analysis. Many algorithms have been proposed over the years for solving the UE model. Recently, attention is given not only to the total link flow results of the UE model, but also to the route flow results of the model, and particularly to the Maximum Entropy User Equilibrium (MEUE) route flow solution that maintains desirable consistency properties.

In this research we experiment with a new algorithmic approach that focuses on local paired alternative route segments. The approach relies on a fundamental understanding that paired alternative segments "capture" the essence of route choices in the UE model in an extremely compact manner.

Traffic Assignment by Paired Alternative Segments (TAPAS) is superior to previous algorithms in several respects. First, it converges to equilibrium very quickly, as we demonstrate with several examples including a large-scale network. In that respect it is a competitive candidate relative to other recent alternatives. In addition, the set of routes used by the method is relatively consistent throughout the iterative process, thus it allows achieving reasonable consistency even at moderate levels of convergence. Last but not least, while certain aspects of the algorithm rely on non-trivial theoretical insights, the key principle is rather simple and likely to be widely understood by the general professional transportation community.

BIO: Dr. Hillel Bar-Gera is a senior lecturer at IEM BGU. His research interests are models and algorithms for travel forecasting and transportation systems planning; traffic safety analyses particularly from a statistical point of view; intelligent transportation systems; and operations research in general. He received his B.Sc. in Mathematics Physics and Computer Science and his M.Sc. in Mathematics from the Hebrew University in Jerusalem. He received his Ph.D. in Civil and Materials Engineering from the University of Illinois at Chicago, specializing in transportation. His dissertation on "Origin-based algorithms for transportation network modeling" was acknowledged by the Transportation Science Section of INFORMS as the best Ph.D. Thesis in transportation for the year 2000. Variants of the algorithm he developed in his thesis are currently used by the majority of travel forecasting software vendors. bargera@bgu.ac.il