Abstract
Traffic assignment is one of the most important stages in transportation planning; however, its application to real case studies in medium- to large- sized cities makes the solution of the model difficult because of the scale and high computational complexity related to the combinatorial and non-linear nature of the problem. The aim of this paper is to present a decomposition method based on sub-region analysis, and a simple heuristic rule for solving large-scale traffic assignment problems. This reduces the total amount of variables and equations of the model and offers a practical solution in a reasonable computing time. The proposed traffic assignment model is applied to the multimodal main road network of the Aburra Valley, Colombia. Such an application of a great amount of variables and equations converts the model into a large-scale problem. The proposed method considerably reduces the computational complexity of the problem, and it reveals accurate solutions in an execution time which is reasonable for such a large-scale model.

Keywords
Traffic assignment problem, large-scale model, decomposition methods, heuristics