New approaches for obtaining an adjustment matrix in traffic modelling

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An origin-destination (OD) matrix is a matrix that says how many drivers go from and to a fixed set of points in a traffic network. Starting with an OD matrix, simulation tools simulate traffic quantities all over a given network. Finding an OD matrix that reproduces somehow real traffic conditions is not an easy task.

Traffic flow estimates (which is in form of a minimization problem) obtained from an OD matrix might be different from real flow measurements. The problem then consists of changing our initial OD matrix to fit real data. This is called the adjustment problem.

We investigate new algorithms to perform matrix adjustment with 4 different methods; "Modified Spiess" which is based of gradient descent, "Ridge" which contains quadratic penalization term and "Lasso" with and without considering initial OD matrix, which an L^1 norm of penalization term is involved.

The two main advantages of these methods are that for large traffic networks, they assure us to obtain the minimum which is the best adjustment matrix that fits real data, and accomplishing such matrix will be less costly in terms of time, iteration steps and processing calculations using machine learning tools. We join written algorithms in R language with "Aimsun" software (a well-known software for traffic simulations) and apply on real traffic networks in order to see the efficiency of methods.