README for "Markov Chain Monte Carlo based inverse modeling of traffic flows using GPS data" MATLAB source code

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Abstract

This document describes the implementation of the Markov Chain Monte Carlo algorithm for estimating traffic flow model parameters from GPS data, introduced in the article "Markov Chain Monte Carlo based inverse modeling of traffic flows using GPS data" by Tossavainen and Work, accepted for publication in Networks and Heterogeneous Media. A preprint of the article is available for download on the second author's website. The source code is hosted at `https://github.com/dbwork/MCMC-based-inverse-modeling-of-traffic`.

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2 Publishing results using this software

We kindly ask any future publications using this software include a reference to the following publication:

Tossavainen, O.-P. and D. B. Work, "Markov Chain Monte Carlo based inverse modeling of traffic flows using GPS data" *accepted for publication in Networks and Heterogeneous Media*, 2013.

3 Structure of the code

Below we give a description of scripts included in the software.

- `updateVehicleWithRiemannSendingReceiving.m`

  contains the implementation of the Algorithm 2 presented in the publication

- `updatevHalfCFLAndSimulateVehicle.m`

  can be used to simulate one vehicle trajectory given an initial velocity field. The script produces a full evolution of the velocity field using Godunov scheme while updating the vehicle position using Algorithm 2 in the publication.

- `updatev.m`

  can be used to compute evolution of the velocity field using Godunov scheme.

4 Running the code

The provided m-files can be used to reproduce the results presented in the publication.

1. Create the true state (velocity field and vehicle trajectories) by running

   `simulateTrueStateUsingRiemannSolver.m`

2. Run the 3-link parameter estimation with poor mixing of the chain using script

   `recoverThreeDiagramsNORATIOS.m`

3. Run the 3-link parameter estimation with good mixing of the chain using script

   `recoverThreeDiagramsWithRatios.m`

4. Run the 4-link parameter estimation with good mixing of the chain using script

   `recoverFourDiagramsWithRatios.m`