INDIAN INSTITUTE OF TECHNOLOGY GANDHINAGAR
Department of Mechanical Engineering

IN332: COMPUTATIONAL SCIENCE AND ENGINEERING

COMPUTATIONAL LAB ASSOCIATED WITH APPLICATION LECTURE 4
TRAFFIC MODELING USING GASDYNAMICS ANALOGY

Download TRAFLOW software package and documentation from the course website
https://sites.google.com/a/iitgn.ac.in/in3xx-cse/config/pagetemplates/digest-of-course-materials
The Kerner's traffic model will be used for all the exercises assigned in this laboratory module

PART A: SOFTWARE FAMILIARISATION TASKS:
(*To be completed in the lab and report submission is not required for this part*)

Chapter 4 (Section 4.2) of the associated report by van Dam consists of a number of traffic simulations such as phantom jams, stop and start waves and effect of a blockade on a ring road. Using the same set of parameters and initial and boundary conditions specified in the report, repeat some of these traffic simulations to get a feel for using this software. *The class can form groups and each group can tackle one of these problems and then compare notes at the end of the lab.*

PART B: COMPUTATIONAL TASKS (TAKE HOME)
NOTE: *An individual concise report on your attempts at constructing reasonable models, implementation in TRAFLOW, selected results with discussions and key lessons learnt must be submitted for this part along with associated simulation input data files no later than 13 April 2011.*

1. Using TRAFLOW software, simulate the formation of a jamiton on a circular ring road on and compare with the results shown on the website http://math.mit.edu/projects/traffic/ (**Optional**. *Bonus points will be given if you attempt this problem*) Using Google map of the Ahmedabad region and making reasonable assumptions extract the outer ring road of Ahmedabad and use TRAFLOW to simulate the formation of jamitons on the outer ring road.

2. Consider traffic flow on the Visat-Gandhinagar Highway segment in front of the temporary campus of IIT Gandhinagar. On the basis of your assumptions with regard to typical traffic conditions on this highway, model the effects of the following scenarios on traffic flow on this road using TRAFLOW
   (a) if a herd of cows cross the highway in a direction perpendicular to the traffic flow over a finite time.
   (b) the illegal sporadic traffic that often runs opposite in direction to the legal traffic direction within the same lane.

For this problem you are required to make reasonably realistic assumptions with regard to starting values of traffic parameters etc. Please do this work independently and do not copy from your friends. You are free to discuss the problems with your colleagues in the class but each student must write his own answer/report.