

1999 HiMCM

Problem: Traffic Lights

Major thoroughfares in big cities are usually highly congested. Traffic lights are used to allow cars to cross the highway or to make turns onto side streets. During commuting hours, when the traffic is much heavier than on any cross street, it is desirable to keep traffic flowing as smoothly as possible. Consider a two-mile stretch of a major thoroughfare with cross streets every city block. Build a mathematical model that satisfies both the commuters on the thoroughfare as well as those on the cross streets trying to enter the thoroughfare as a function of the traffic lights. Assume there is a light at every intersection along your two-mile stretch.

First, you may assume the city blocks are of constant length. You may then wish to generalize to blocks of variable length.