

# MOBILITIES, TECHNOLOGIES AND SUSTAINABLE DEVELOPMENT

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# Today's topics

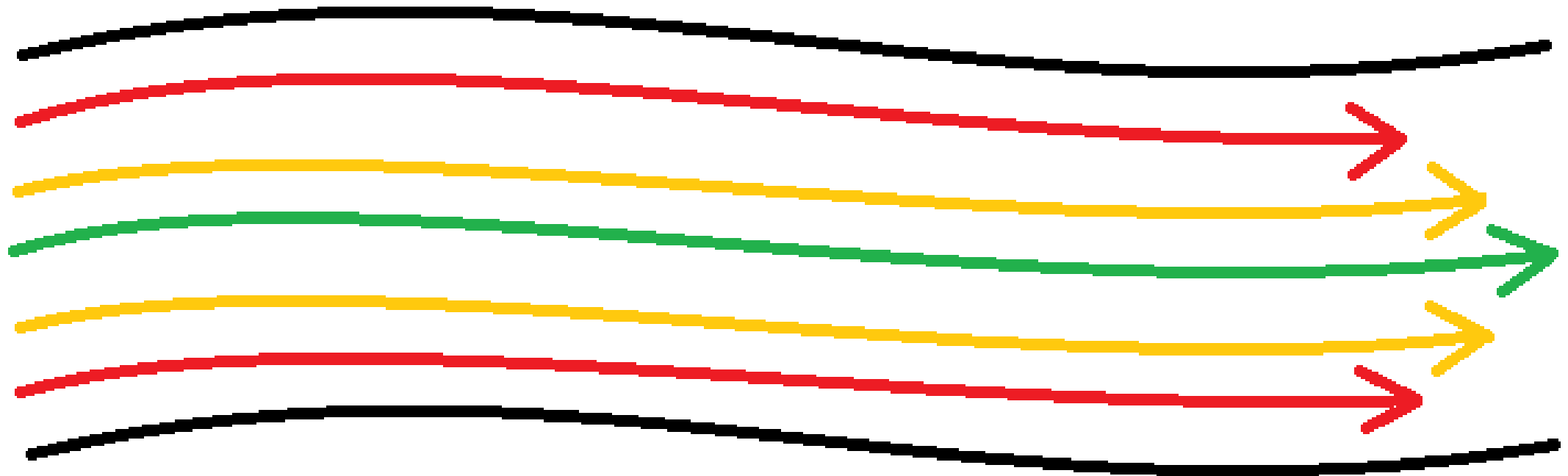
## Traffic Planning and Safety



# The Nature of Traffic Flow Problems: An Integrated Approach to Transport Safety Management

- How can the factor of human driver's behavior influence traffic flow? Are there ways to predict human driver's behavior?
- How can traffic flow problems such as driving speed, bottlenecks, merging and splitting lanes, U-turn, and stop-and-go be resolved using an integrated approach to theoretical and technical framework for dynamic traffic regulation and road safety management?
- Whether an integrated approach, using human factor and fluid motion analysis, alongside other mathematical models, is efficient and effective in transport flow management. To what extent an integrated approach is more reliable and sustainable?
- How do speed control, density, road quality, driving culture impact traffic flow and traffic safety? What is the nature of traffic safety in regulated and unregulated intersections; what are the advantages and disadvantages of roundabouts?
- How can the use visual monitoring traffic system (mounted cameras) be optimized in this study apart from its conventional functions such as recording the speed of cars and recording travel time?

# River flow



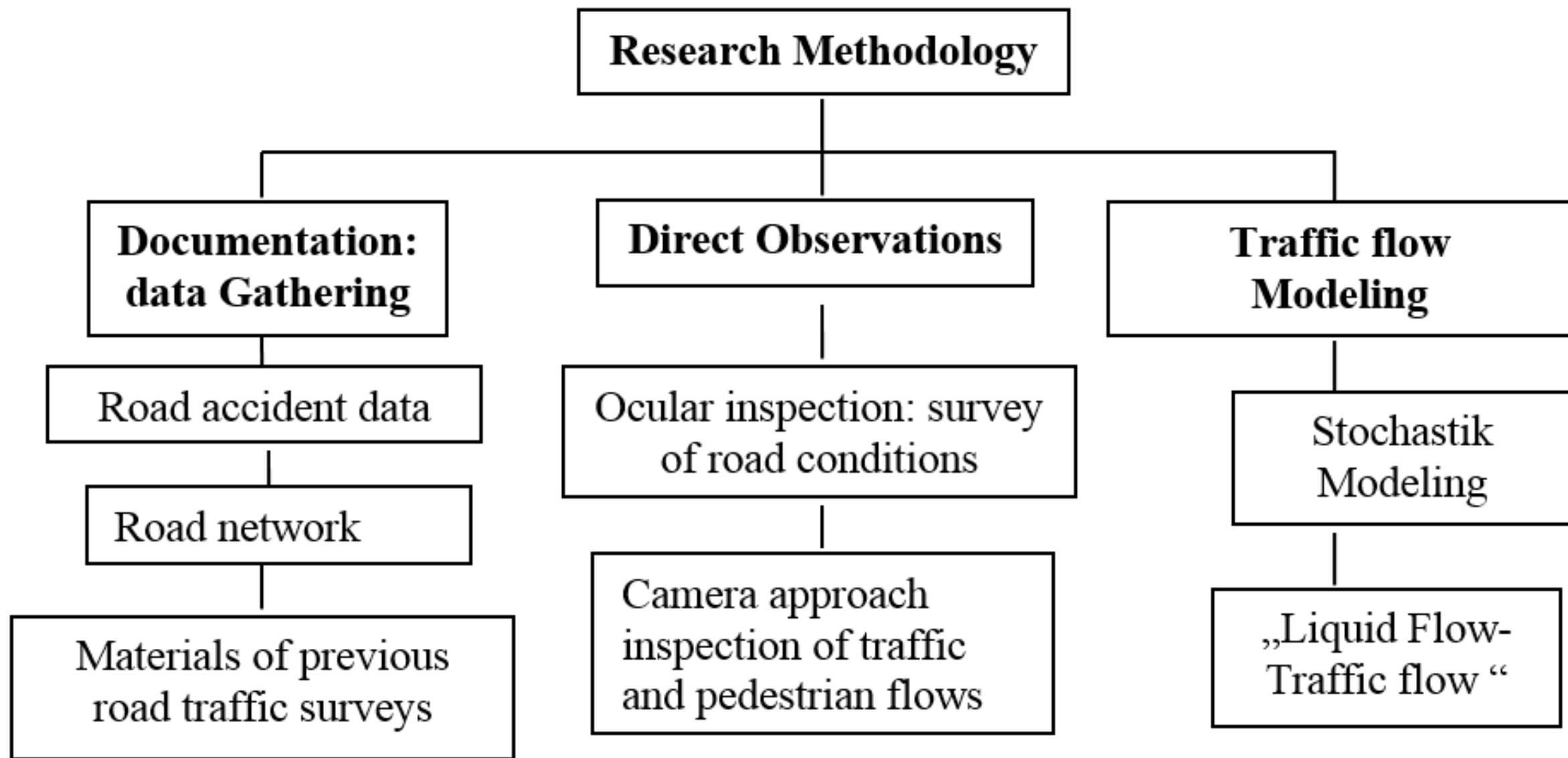
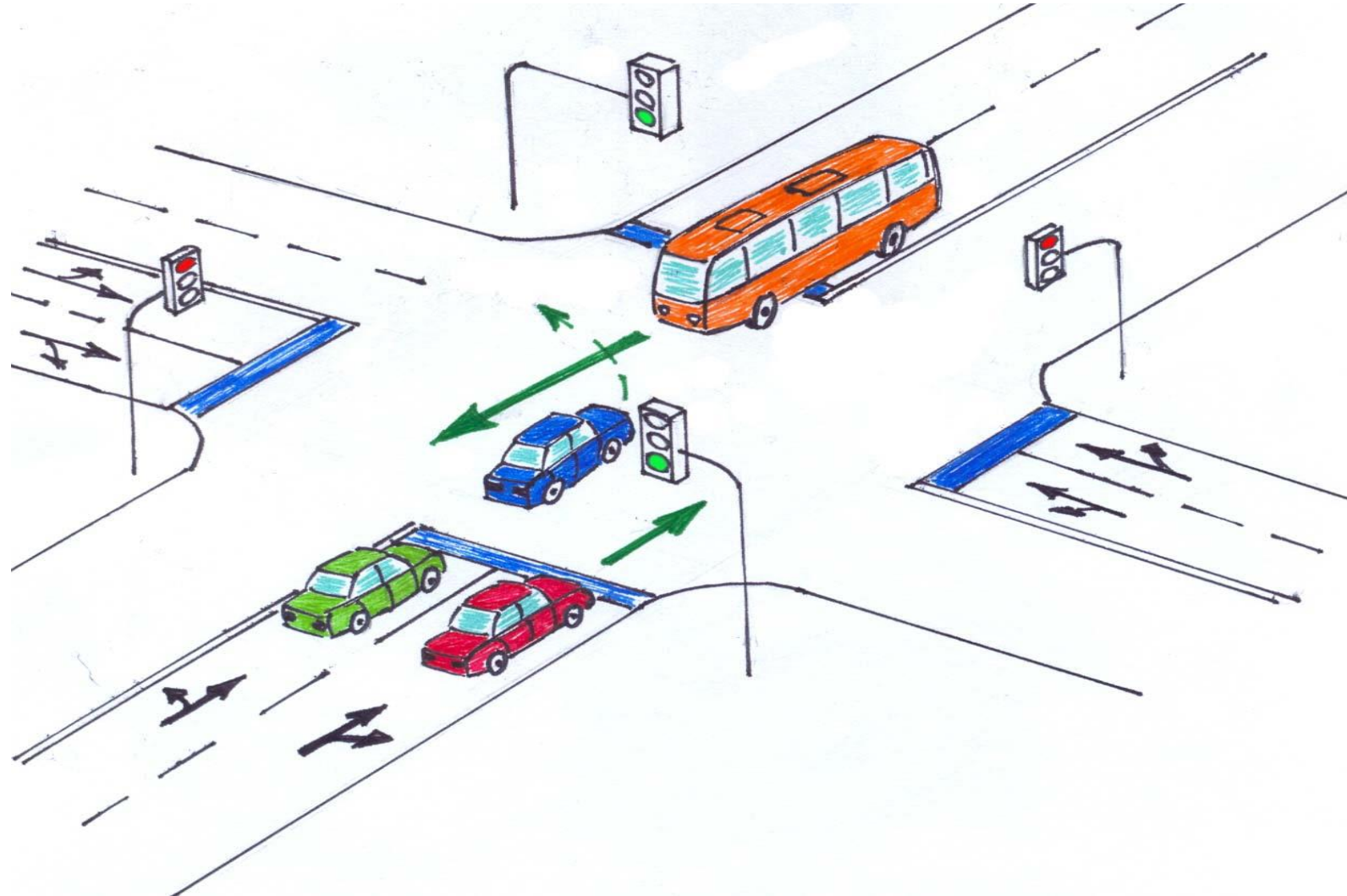


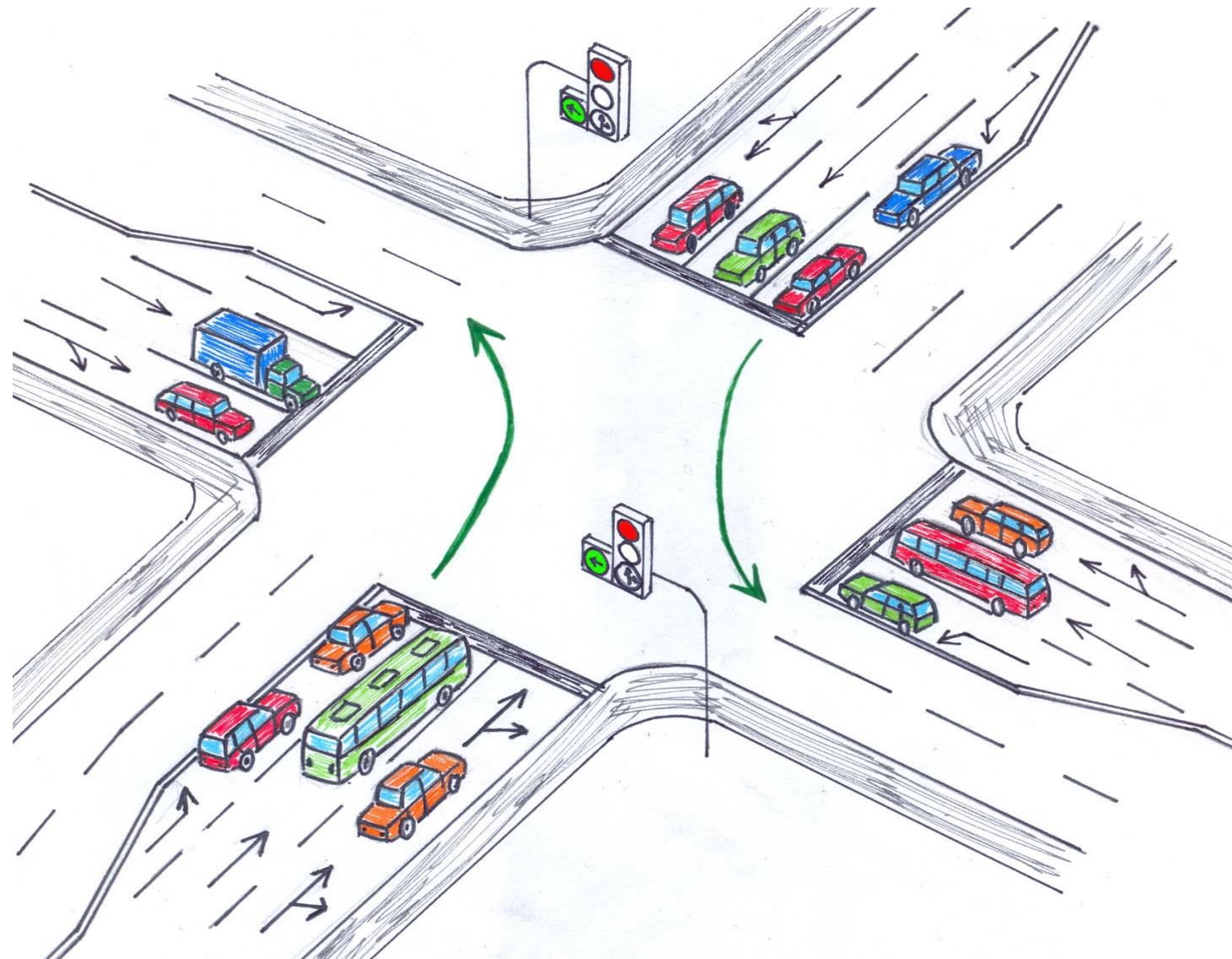
Diagram of Road Traffic Research Methods

The main difficulty in crossing intersections is  
left turn

# Integrated left turn lane and straight lane

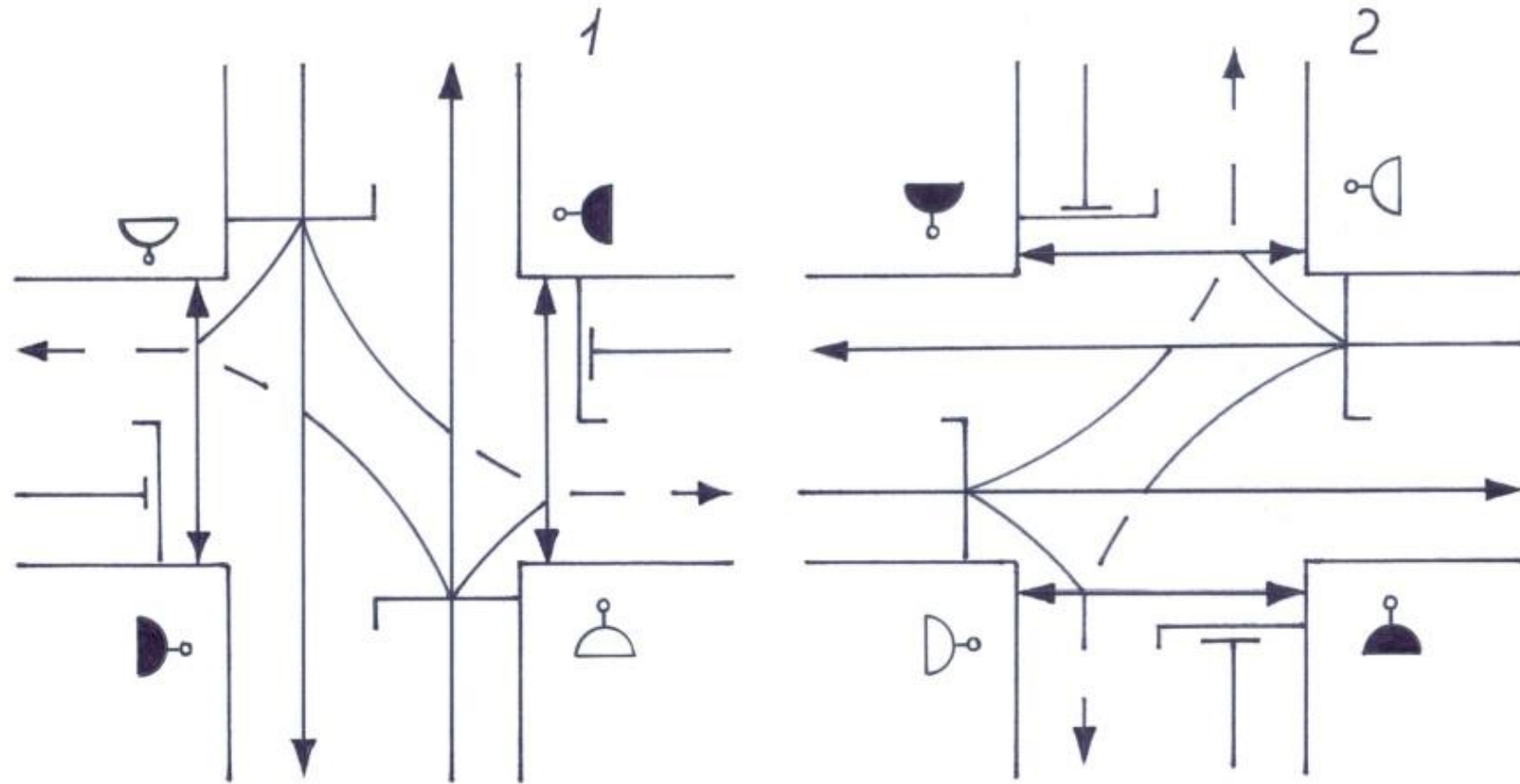


# Separated left turn lane from straight lane

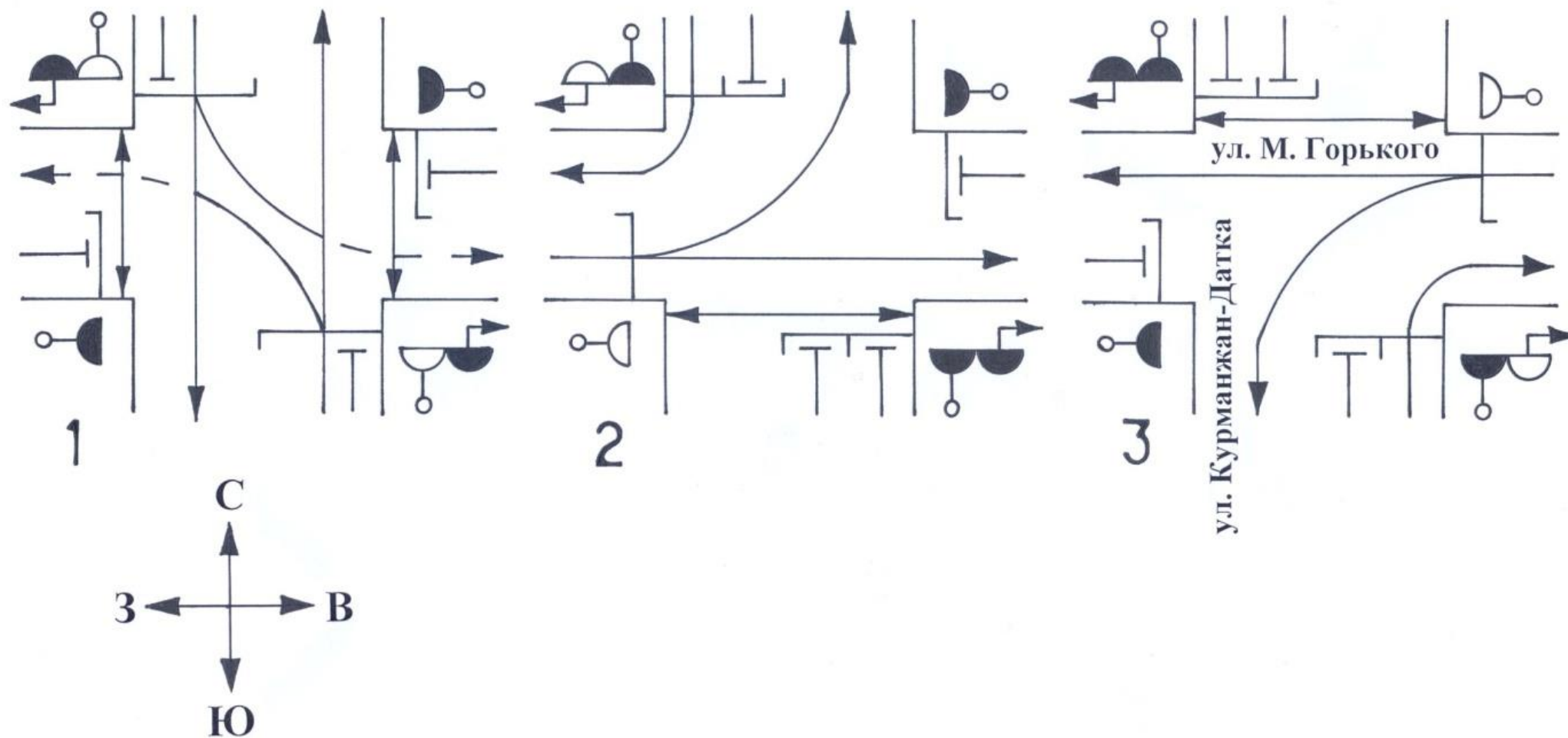




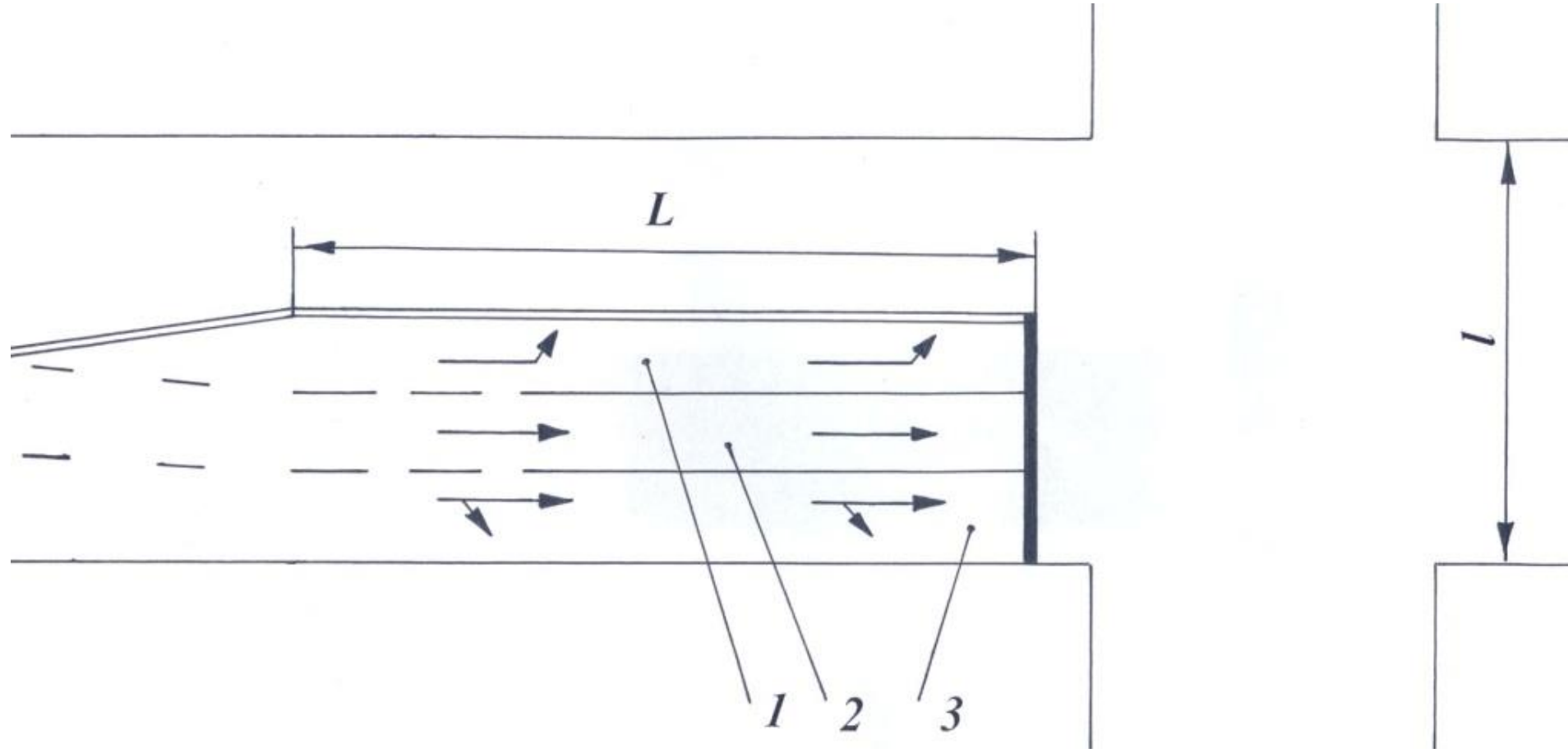
# Two-phase regulation of intersection



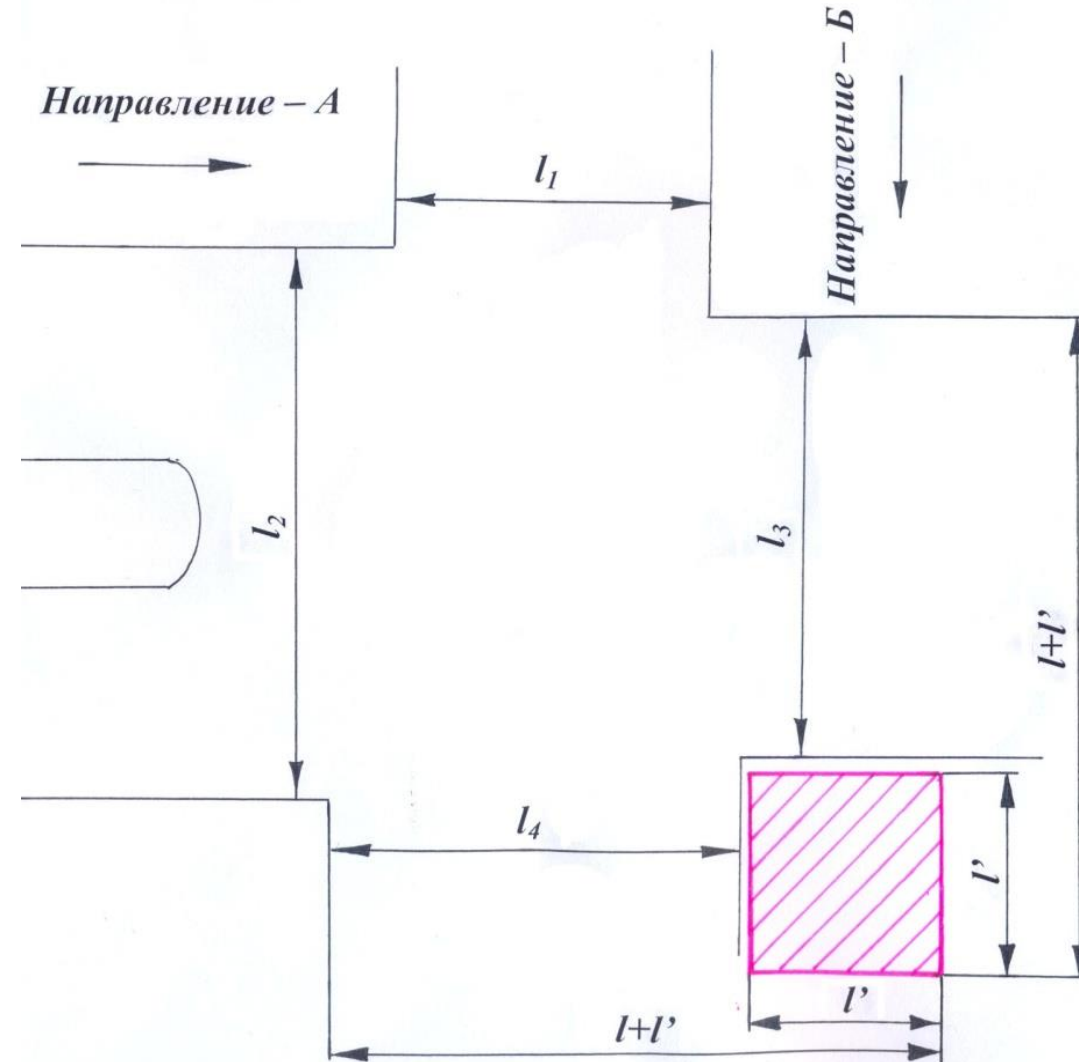
# Scheme of three-phase regulation of intersection M. Gorky and Kurmanjan-Datka



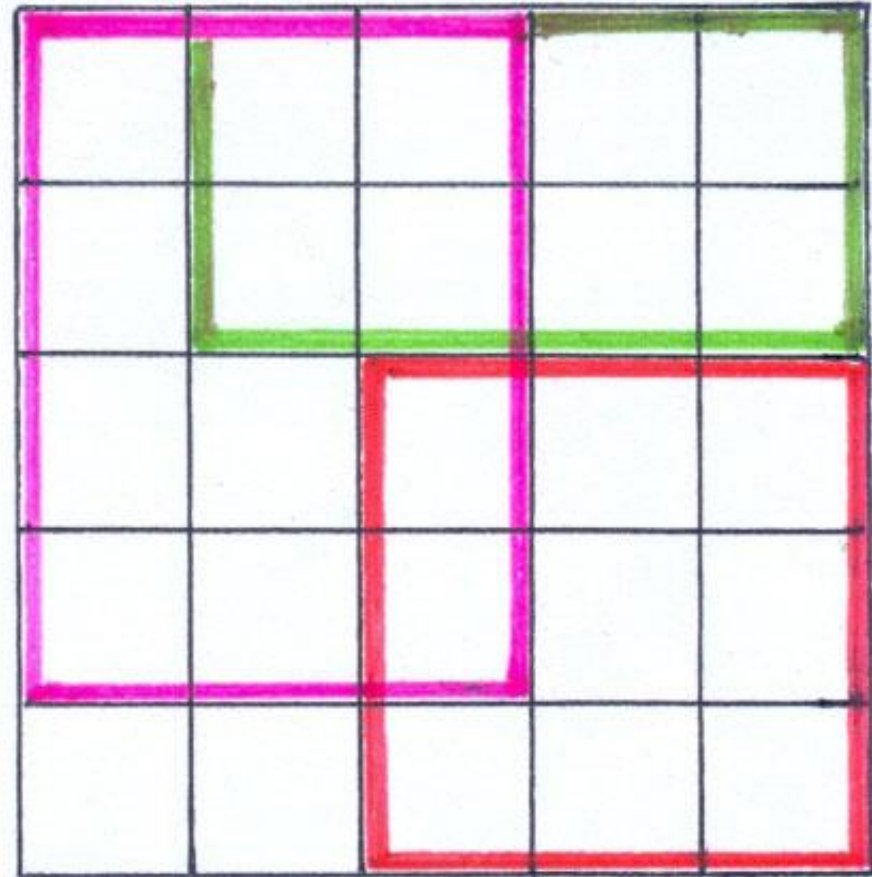
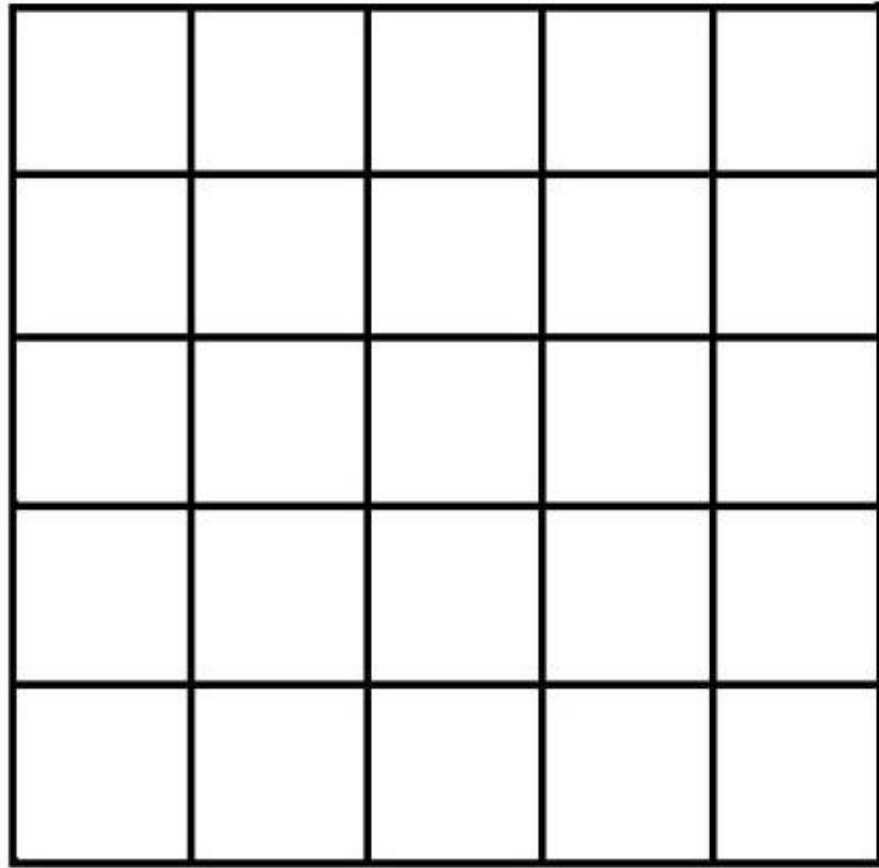
# The length of the left turn lane



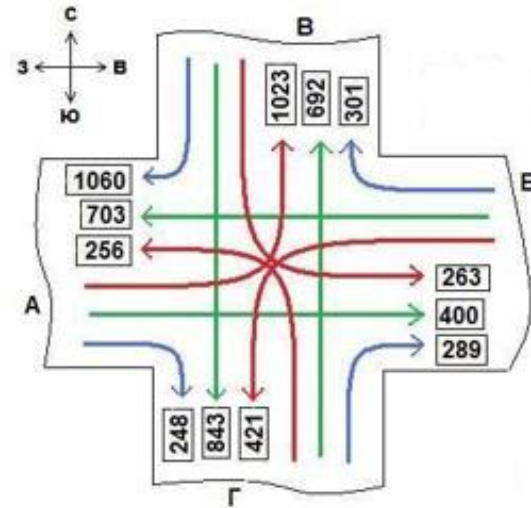
# Pedestrian traffic light regulation



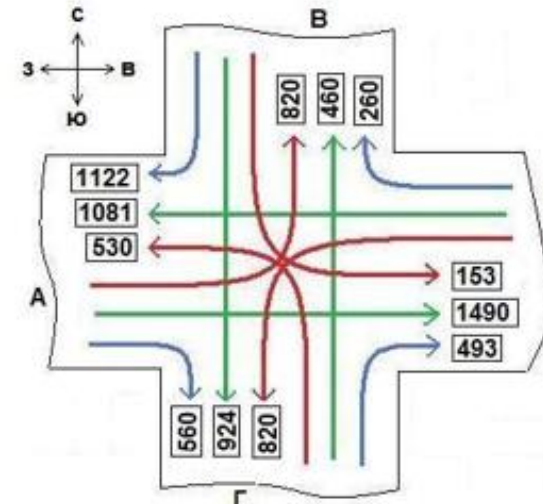
# Drawing arbitrary routes on a conditional grid



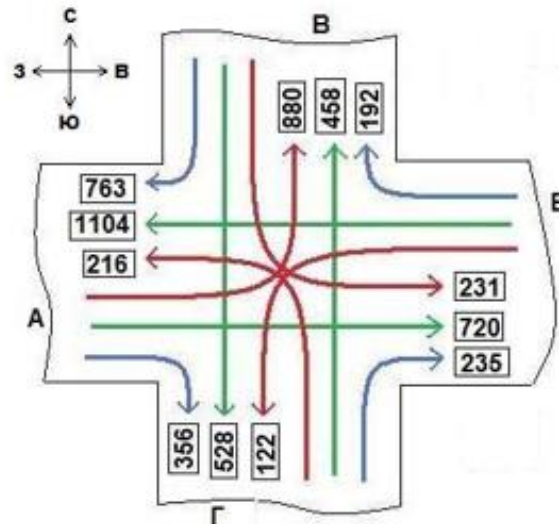
# Conditional cartograms of hourly peak intensity vehicle traffic flow



a)

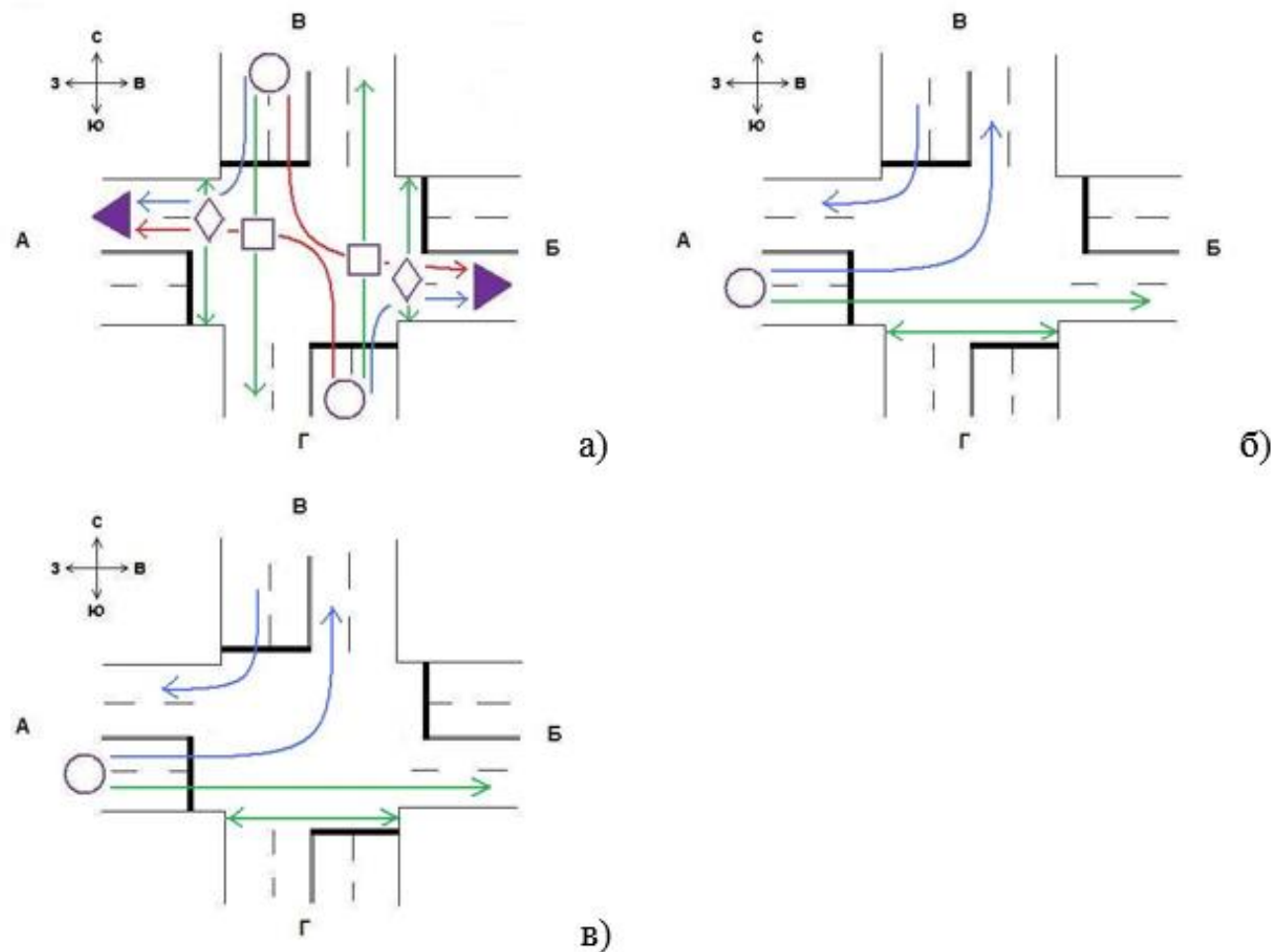


б)

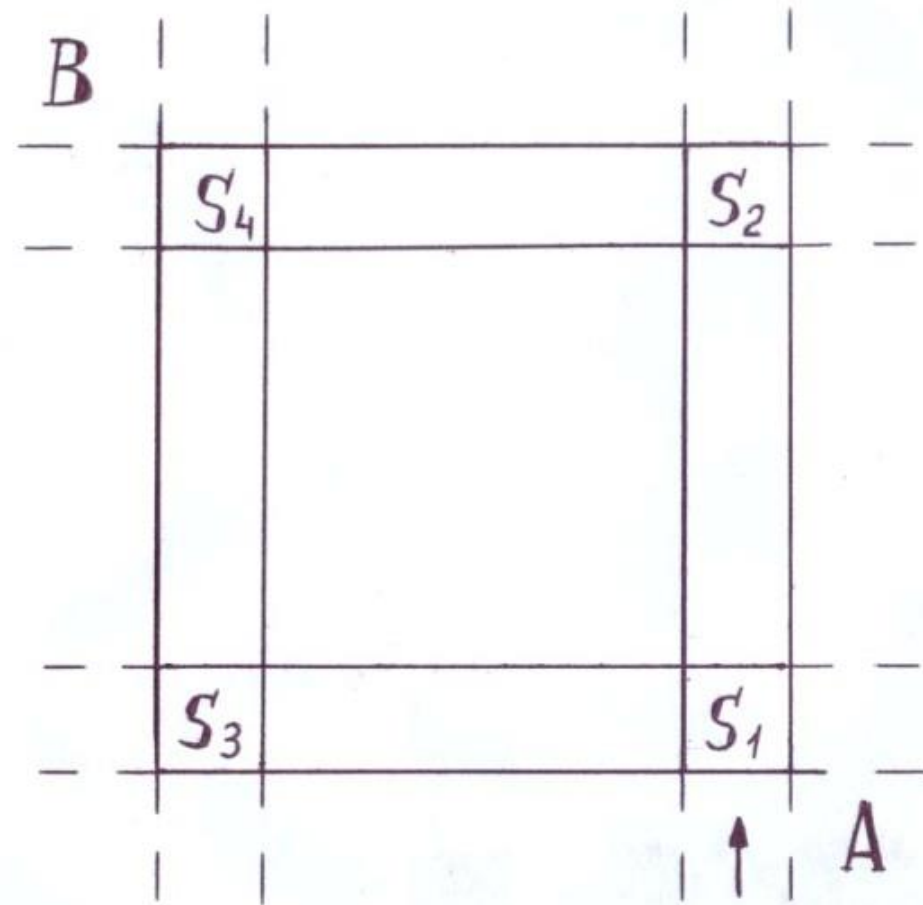


B)

Degrees of difficulty of intersection M. Gorky and Kurmanzhan Datka streets after the introduction of the third phase: a) - the first phase; b) - the second phase; c) – third phase, ○ – conflict point of deviation; ▲ – conflict merge point; ◇ - conflict point of intersection of the vehicle and pedestrian flows; □ – conflict point of intersection

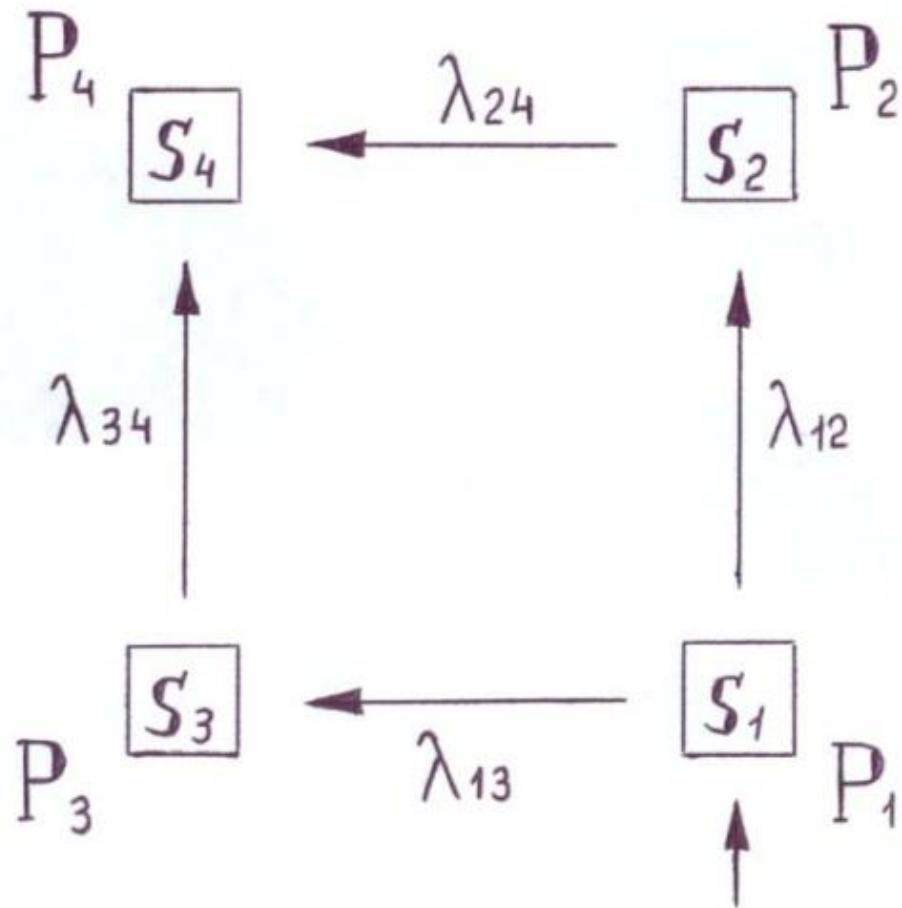


The simplest square of the route. Where: A - the point of departure of cars; B - the point of destination of cars; S - is the state of the system.





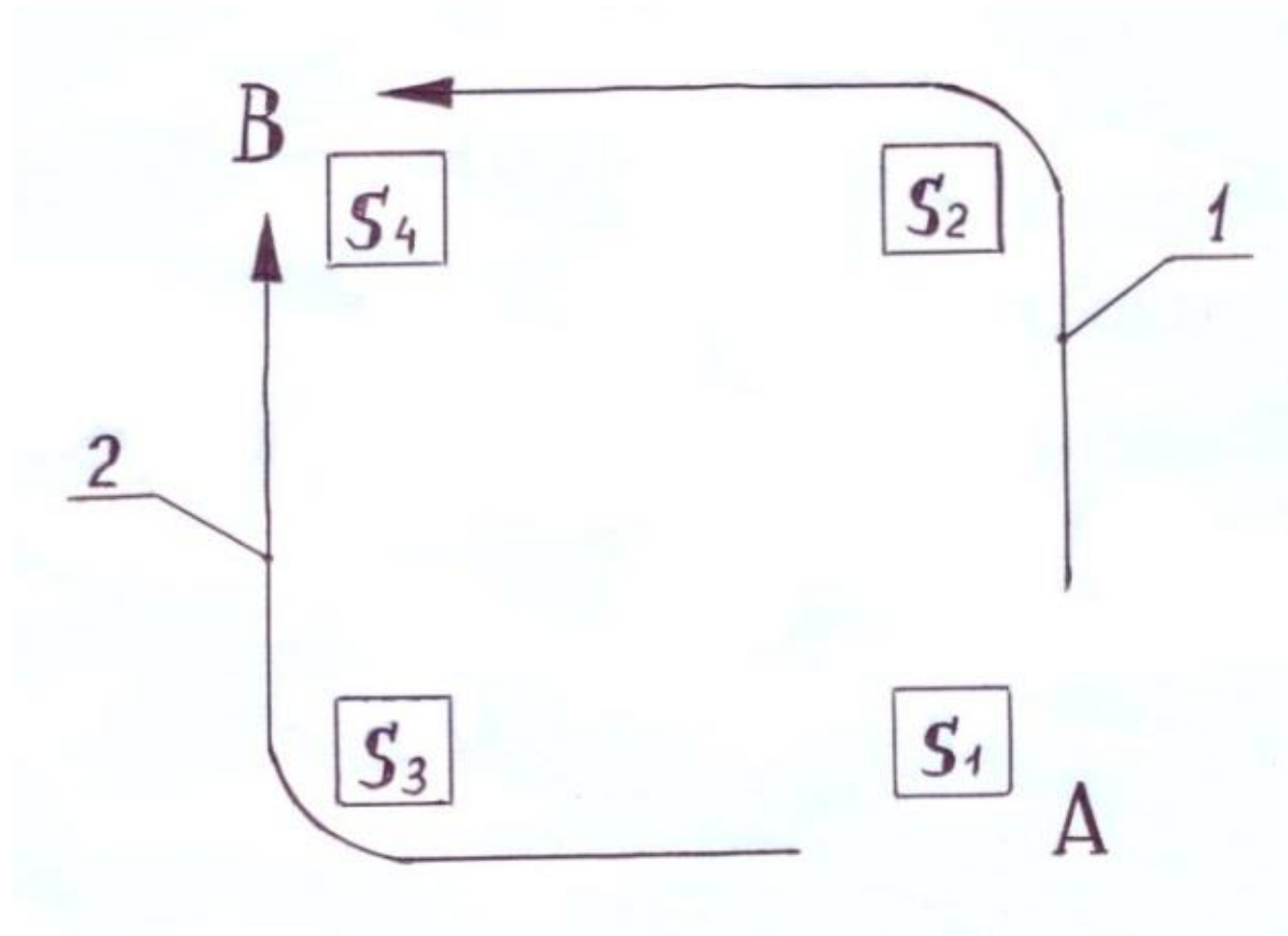
Marked graph of the route of movement. Where:  $P$  – probability of states;  $\lambda$  is the intensity of the flow of events



The state of the system:

- $S_1$  - the car is at the first intersection (section),
- $S_2$  - the car is at the second intersection (section),
- $S_3$  - the car is at the third intersection (section),
- $S_4$  - the car is at the fourth intersection (section).

Route options Where: 1 - the first route; 2 is the second route.



State graph of system  $S$  with instantaneous transitions

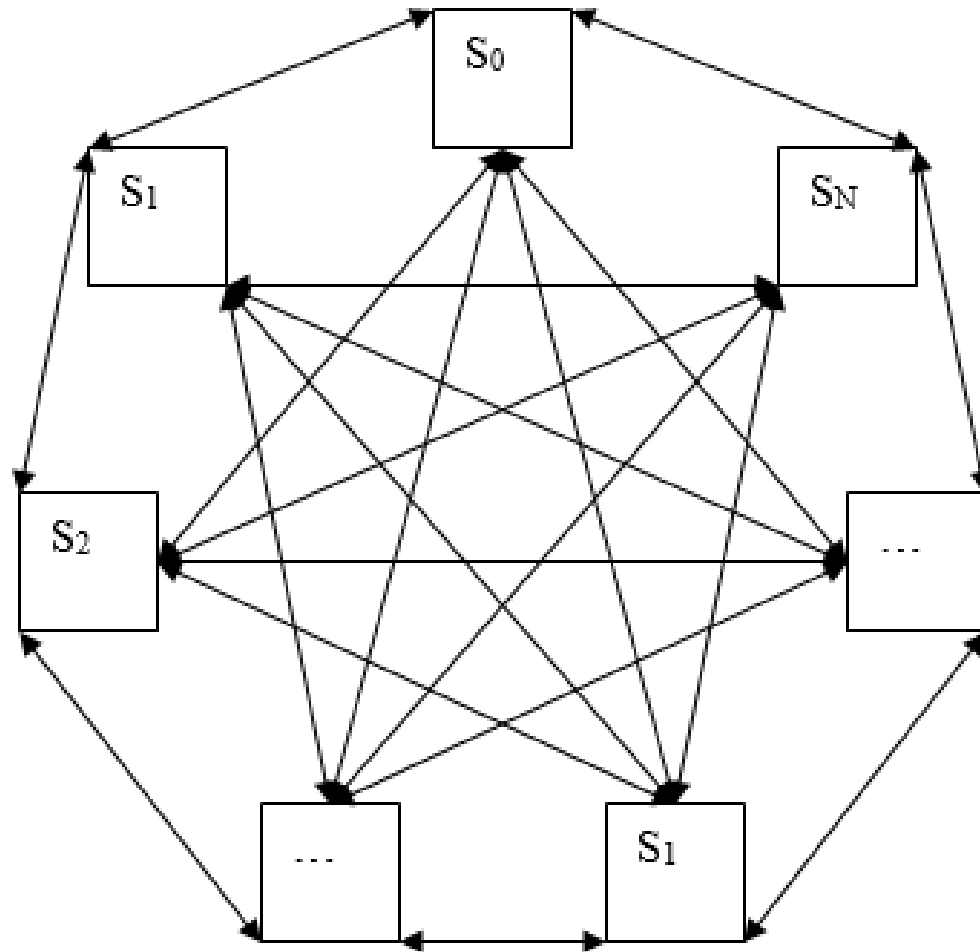
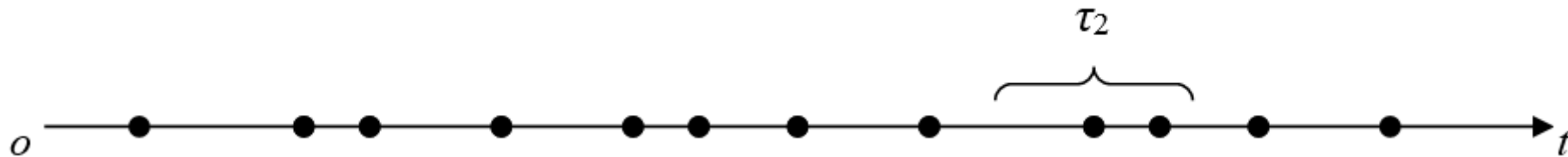


Image of the flow of events on the time axis



Aftereffect flow image

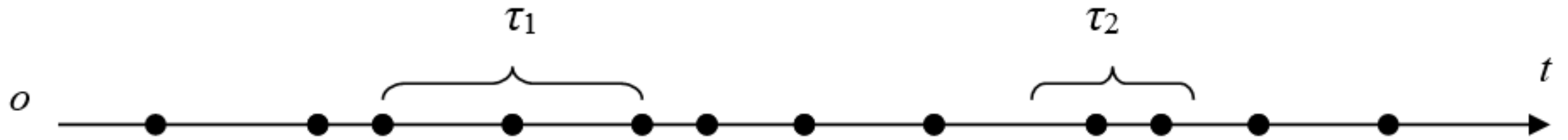
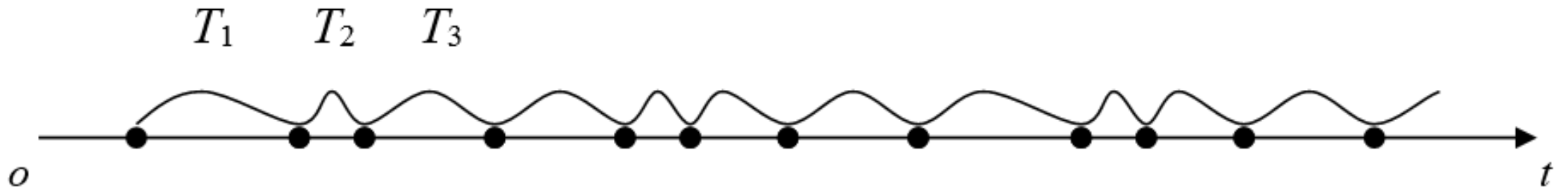
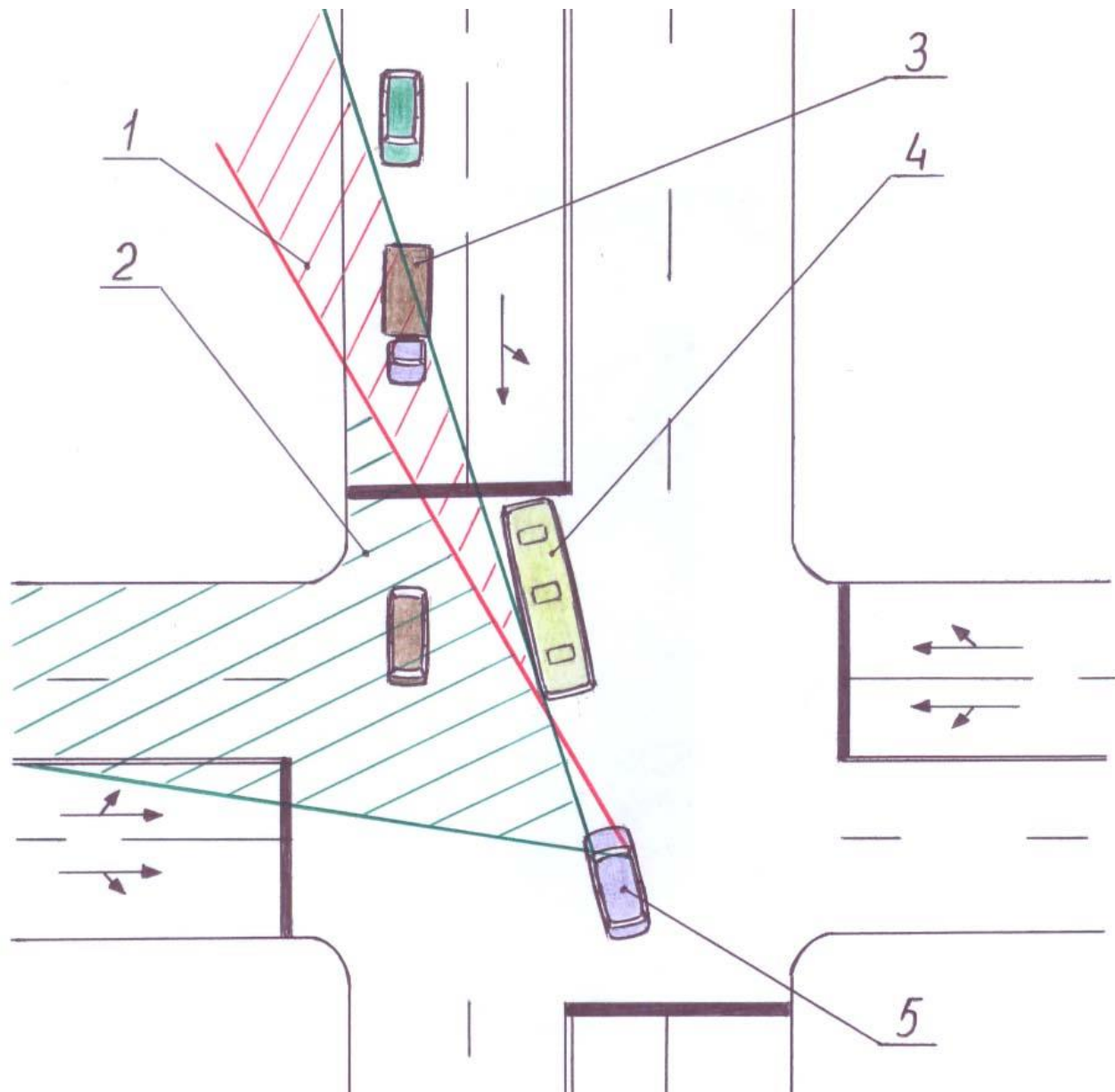


Image of a recurrent stream





Visibility of the car with left- and right-hand drive steering

Thank you for your attention!

