Mathematical model of traffic flow with two time scales

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The paper proposes to consider a microscopic model of traffic flow on the example of a major city. The model is based scheme of following the leader, the calculation is similar predictor-corrector scheme in the theory of differential calculus. The model takes into account the various changes the flow: speed characteristics of vehicles, narrowing roads, changing traffic lights, random start vehicles with a given destination, the transit flow of cars through the city, etc. Parameters of vehicles, such as speed and position are computed in two stages. In the first step the values predicted at the time, roughly equal to the time the driver's reaction. In the second step, the obtained values are used as a predictor to obtain more accurate values. The problem of finding the optimal operation of traffic lights to ensure maximum capacity is reviewed. Without loss of generality, we define the operation of traffic lights with function $f(\beta_1 \dots \beta_P)$ using the shift periods $\beta_1 \dots \beta_P$ relative to the base period β_0 where P is the number of traffic lights in the region. The average speed of transit traffic that goes through the area is the objective function that we need to maximize by choosing the value of the shift periods. This task is in some sense, the task of searching the so-called "green wave".