

## Vehicle attitude estimation with the aid of GPS/INS data

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In this presentation, a problem of the vehicle attitude estimation will be introduced. We will present a brief survey of selected methods used for vehicle attitude estimation and afterwards, we propose our solution of this problem.

The attitude of a moving vehicle is determined by means of global positioning system (GPS) but the data set is incomplete because of the big trees, buildings, etc. We aim to estimate the attitude within these GPS data fallouts. For this purpose, we can use an information from the inertial navigation system (INS) that includes a complete noisy information about vehicle velocity, yaw rate and acceleration. We focus on the off-line attitude estimation, i.e. we solve the task of a subsequent reconstruction of the vehicle attitude.

We construct a state model describing the vehicle motion. This model uses kinematics laws, i.e. it is not concerned with the causing forces. It exploits a dependency among the vehicle attitude, velocity and acceleration. The estimation algorithm is based on the Kalman filtering and smoothing.

The presented problem is solved within the framework of the beginning cooperation with the Škoda auto, a.s. This company is interested in cooperation with the research center DAR as of next year.

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