

### **Abstract**

*At signalized intersections, turning vehicles often use the same shared lane together with the through traffic. Since a permitted left-turn movement has to give way to the opposing through movement, it has to wait if necessary and thus impedes the through movement in the same direction. In the real-world, if the left-turn movement is permitted controlled, the through movement at the same approach can be totally blocked by waiting left-turning vehicles during the green time. Thus, the green time for the shared lane cannot be efficiently utilised and the lane capacity under consideration cannot be fully received. In this paper, a mathematical model is presented for an exact calculation of the blockage probability caused by permitted turning vehicles and for the estimation of the capacity of single-shared lanes at signalized intersections. According to the probability and combinatory theory, a mathematically exact model is developed. The proposed model can be applied to shared lanes either with left-turn or with right-turn movement. Respectively, by extending the model, also the capacity for the Right-Turn-On-Right situation can be exactly calculated. Furthermore, in this paper, the model is generalized to turning movements with so-called sneakers within the intersection. The generalized extension provides a more realistic solution for real-world intersections where, in a normal case, there are several places downstream of the stop-line for turning vehicles. The mathematical formulation for the generalization is more complicated. For applications in the practice, monographs are produced for estimating the shared lane capacity under different traffic conditions. In addition, a set of approximation functions are recommended based on the mathematically exact results.*

**Key words:** MLP neural network, RBF neural network.