Abstract—**The aim of this paper is to investigate and simulate traffic flow model with velocity-density function. The velocity- density function obtained from multiple linear regression method. The traffic flow model is described by a macroscopic model where the model of traffic flow considers interactions related to the vehicle. This model is also known as the Lightill, Whitham, and Richards (LWR) model. The data is obtained from direct observation in Jalan Asia Afrika and Jalan Merdeka, Bandung, West Java, Indonesia. Here the approximation of velocity-density function by multiple linear regression method** $v(\rho, x_1, x_2) = 2.7254 - 1.186\rho - 0.1595x_1 - 0.0395x_2$. **Moreover, through the numerical simulation with Lax-Wendroff method at final time T = 5.88 seconds, four models of traffic flow simulation M1, M2, M3, and M4, show differences.**

Index Terms—**traffic flow, multiple linear regression, velocity- density, simulation.**