

The aim of this thesis is to provide a comprehensive overview of the main approaches to modeling data loaded with redundant zeros. There are three main subclasses of *zero modified models* (ZMM) described here – *zero inflated models* (the main focus lies on models of this subclass), *zero truncated models* and *hurdle models*. Models of each subclass are defined and then a construction of maximum likelihood estimates of regression coefficients is described. ZMM models are mostly based on Poisson or negative binomial type 2 distribution (NB2). In this work, author has extended the theory to ZIM models generally based on any discrete distributions of exponential type. There is described a construction of MLE of regression coefficients of these models, too. Just few of present works are interested in ZIM models based on negative binomial type 1 distribution (NB1). This distribution is not of exponential type therefore a common method of MLE construction in ZIM models cannot be used here. In this work provides modification of this method using quasi-likelihood method. There are two simulation studies concluding the work.