The main goal of this Diploma thesis is to describe an approach for modeling run-off triangles of nonlife insurance (calculation of IBNR reserve) based on state space models and apply the method to the selected run-off triangles. In difference from (Atherino a kol., 2010) the KFAS package in R software is used for modeling purposes in the numerical study at the end of the thesis. One provides a preview of various possibilities of data and model adjustment applied to the same run-off triangles in order to asses added value of these steps (logartihmic transformation of input data, interventions for outliers etc.). A special attention is devoted to lognormal modification of the basic state space model. An integral part of the numerical study in the thesis is a residual diagnostic of models and simulation approach to IBNR reserves.