Regression models with increasing number of unknown parameters.

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It is considered the regression model $Y=X\theta+\varepsilon$, where $Y = (y_1,y_2,\ldots,y_N)^T$ is the vector of responses, X – is the matrix of experiment, $\theta = (\theta_1,\theta_2,\ldots,\theta_m)^T$ is the vector of unknown parameters, $\varepsilon = (\varepsilon_1,\varepsilon_2,..,\varepsilon_N)^T$ is the vector of a random errors, m is a number of unknown parameters, N is a number of observations.

It is assumed that number of unknown parameters ($m(N)$) depends on number of observations (N) and ($m(N)$) can increase when (N) goes up. Variance of the errors $Var(\varepsilon_i)=\sigma_i^2$ are different and unknown. At each point of observation there is only one response, which does not allow to estimate the variances.

The new methods for estimating of unknown parameters and the elements of the covariance matrix of deviation vector of unknown parameters in such models are suggested. The method allows to construct a confidence region for unknown function in regression models. The method is extended for nonlinear models and can be considered as a generalization of well-known Newton-Gauss method for estimating unknown parameters in non-linear regression models.

Numerical examples, demonstrating results are given.