Deni Listiyo Rini. 2006. **Estimasi Parameter Model Regresi Data Tersensor Tipe II Berdistribusi Eksponensial Berdasarkan Maksimum Likelihood Estimator (*MLE*)**. Skripsi ini dibawah bimbingan Drs. Ardi Kurniawan, M. Si dan Toha Saifudin, S. Si, M. Si. Jurusan Matematika. Fakultas Matematika dan Ilmu Pengetahuan Alam. Universitas Airlangga.

ABSTRAK

Penulisan skripsi ini bertujuan untuk memperoleh estimator parameter model regresi data tersensor tipe II berdistribusi Eksponensial berdasarkan *Maksimum Likelihood Estimator* (MLE). Tujuan dari MLE adalah untuk mencari nilai estimator yang dapat memaksimumkan fungsi Likelihood. MLE didasarkan sepenuhnya pada informasi yang diperoleh melalui data acak.

Secara umum bentuk model regresi dari data yang berdistribusi Eksponensial adalah $y = x\beta + z$. Untuk mengestimasi parameter regresi Eksponensial pada data tersensor tipe II dengan MLE dapat diperoleh dengan menyelesaikan sistem persamaan $\frac{\partial l(\beta)}{\partial \beta_k} = -\sum_{j=1}^{r} x_{jk} + \sum_{j=1}^{r} x_{jk} \exp(y_j - x_j \beta) + (n-r) x_{rk} \exp(y_r - x_r \beta) = 0$. Metode yang digunakan untuk menyelesaikan system persamaan tersebut dalam skripsi ini adalah dengan metode Newton – Raphson melalui *Software* Mathematica.

Hasil yang didapatkan untuk estimator $\hat{\beta}$ pada regresi data tahan hidup pasien *Myeloma* (**D. Collet, 1994**) dengan n =48 dan r =38 adalah $\hat{\beta}_1 = 2.58163$, $\hat{\beta}_2 = -0.0044879$, $\hat{\beta}_3 = -4.4395$, $\hat{\beta}_4 = -0.021072$, $\hat{\beta}_5 = 0.0877849$, $\hat{\beta}_6 = 0.0213067$, $\hat{\beta}_7 = 0.00229421$, $\hat{\beta}_8 = 0.894243$, $\hat{\beta}_9 = 0.0832288$, $\hat{\beta}_{10} = 0.0143824$, $\hat{\beta}_{11} = 0.0226338$, $\hat{\beta}_{12} = -0.267823$, dan $\hat{\beta}_{13} = 0.0189183$. Bentuk persamaan regresi yang diperoleh adalah :

$$\hat{y}_j = 2.58163 - 0.0044879x_{j2} - 4.4395x_{j3} - 0.021072x_{j4} + 0.0877849x_{j5} + 0.0213067x_{j6} + 0.00229421x_{j7} + 0.894243x_{j8} + 0.0832288x_{j9} + 0.0143824x_{j10} + 0.0226338x_{j11} - 0.267823x_{j12} + 0.0189183x_{j13}$$

sehingga $\hat{t}_j = e^{\hat{y}_j}$, dengan $j = 1,2,...,r$.

Kata Kunci : Model Regresi Linier, Data Tersensor Tipe II, Distribusi Eksponensial, *Maksimum Likelihood Estimator* (MLE)

Deni Listiyo Rini, 2006. ***The Parameter Estimation Regression Model of Type II Censored Sample from An Exponential Distribution with Maximum Likelihood Estimator (MLE)***. This skripsi in under the guidance by Drs. Ardi Kurniawan, M.Si, and Toha Saifudin, S.Si, M.Si. Mathematics major subject of Mathematics and Natural Science Faculty Airlangga University.

ABSTRACT

The purpose of this *skripsi* is getting the parameter estimation of regression model type II for censored sample from an Exponential distribution based on *Maximum Likelihood Estimator* (MLE). MLE is used to get estimator value that can maximize the Likelihood Function. MLE is based on the information that is obtained from random sample.

The generalize regression model for sample with an Exponential distribution is $\underset{\sim}{y} = \underset{\sim}{x}\underset{\sim}{\beta} + \underset{\sim}{z}$. To estimate the Exponensial regression parameter of type II for censored sample using an MLE can get by solving the system of $\frac{\partial l\left(\underset{\sim}{\beta}\right)}{\partial \beta_k} = -\sum_{j=1}^{r} x_{jk} + \sum_{j=1}^{r} x_{jk} \exp\left(y_j - \underset{\sim}{x_j}\underset{\sim}{\beta}\right) + (n-r)x_{rk} \exp\left(y_r - \underset{\sim}{x_r}\underset{\sim}{\beta}\right) = 0$. The method that used to solve system of the equation on this skripsi is Newton - Raphson method by software of Mathematica.

The result got for estimator of $\hat{\underset{\sim}{\beta}}$ on the regression data of survival time from patients of *Myeloma* (**D. Collet, 1994**) with n=48 and r=38 are $\hat{\beta}_1$ = 2.58163, $\hat{\beta}_2$ = -0.0044879, $\hat{\beta}_3$ = -4.4395, $\hat{\beta}_4$ = -0.021072, $\hat{\beta}_5$ = 0.0877849, $\hat{\beta}_6$ = 0.0213067, $\hat{\beta}_7$ =0.00229421, $\hat{\beta}_8$ =0.894243, $\hat{\beta}_9$ =0.0832288, $\hat{\beta}_{10}$ =0.0143824, $\hat{\beta}_{11}$ = 0.0226338, $\hat{\beta}_{12}$ =-0.267823, and $\hat{\beta}_{13}$ =0.0189183. The regression model that is obtained is

$$\hat{y}_j = 2.58163 - 0.0044879x_{j2} - 4.4395x_{j3} - 0.021072x_{j4} + 0.0877849x_{j5} + 0.0213067x_{j6} + 0.00229421x_{j7} + 0.894243x_{j8} + 0.0832288x_{j9} + 0.0143824x_{j10} + 0.0226338x_{j11} - 0.267823x_{j12} + 0.0189183x_{j13}$$

so $\hat{t}_j = e^{\hat{y}_j}$, with $j = 1,2,...,r$.

Key Word : Linier Regression Model, Type II for Censored Sample, Exponential Distribution, Maximum Likelihood Estimator (MLE).