Errata

Title: Granular loss models in reserving
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This errata document contains a list of mistakes and their corrections, which were detected after the submission on July 31, 2014.

1. page 8, line 7: As the time between two successive events occurrence follows exponential distribution with parameter μ, μ is also the mean of this process and can be estimated as a sample mean.
   correct: As the time between two successive events occurrence follows exponential distribution with parameter μ, $\frac{1}{\mu}$ is also the mean of this variable and can be estimated as a sample mean.

2. page 8, line 22:
$$\hat{\mu}_w = \frac{1}{n-1}\sum_{i=2}^{n}(t_i - t_{i-1})$$
   correct:
$$\hat{\mu}_w = \frac{1}{\frac{1}{n-1}\sum_{i=2}^{n}(t_i - t_{i-1})}$$

3. page 9: Definition of non-homogeneous Poisson process taken from Ross (1996):

   Definition (Non-homogeneous Poisson process)**.** *A counting process* $\{N_t, t \geq 0\}$ *is said to be a non-homogeneous Poisson process with intensity function* $v(t)$, $t \geq 0$ *if:*

   (a) $N_0 = 0$.
   (b) Numbers of events in disjoint intervals are independent
   (c) For all $t \geq 0$ *probability of exactly one event occurrence in an interval* $(t, t+h]$ *is* $v(t)h + o(h)$.
   (d) For all $t \geq 0$ *probability of at least two events events occurrence in an interval* $(t, t+h]$ *is* $o(h)$.

   For such a process it is true that:
$$\mathrm{P}(N_{t+s} - N_t = n) = \frac{(\mu_{t+s} - \mu_t)^n}{n!}\exp\{-(\mu_{t+s} - \mu_t)\}$$
   where $\mu_t = \int_0^t v(x)dx$.

   To estimate the intensity we might use some of the methods described in Drazek (2013) which are based on the maximum likelihood method.

4. page 10, line 17: ... where T_0 is the occurrence time of a claim.
   correct: ... where T_0 is the occurrence time of a claim and D is a random variable with discrete distribution.

5. page 11, line 4: We observe average delay distribution
   correct: We observe average delay

6. page 11, line 8:
$$E\left(D \mid T_0 + D \le t\right) = \int_0^t f_t(x)dx$$
   correct:
$$E\left(D \mid T_0 + D \le t\right) = \int_0^t x f_t(x)dx$$

7. page 11, line 9:
$$= \int_0^t x \frac{\left(1-\frac{x}{t}\right)\frac{1}{\lambda}\exp\left\{-\frac{t}{\lambda}\right\}}{1-\frac{\lambda}{t}\left(1-\exp\left\{-\frac{t}{\lambda}\right\}\right)}dx$$
   correct:
$$= \int_0^t x \frac{\left(1-\frac{x}{t}\right)\frac{1}{\lambda}\exp\left\{-\frac{x}{\lambda}\right\}}{1-\frac{\lambda}{t}\left(1-\exp\left\{-\frac{t}{\lambda}\right\}\right)}dx$$

8. page 11, line 14:
$$= t\lambda\exp\left\{-\frac{t}{\lambda}\right\} + \lambda\left[-\lambda\exp\left\{-\frac{x}{\lambda}\right\}\right]_0^t$$
   correct:
$$= -t\lambda\exp\left\{-\frac{t}{\lambda}\right\} + \lambda\left[-\lambda\exp\left\{-\frac{x}{\lambda}\right\}\right]_0^t$$

9. page 11, line 16:
$$\int_0^t \frac{x^2}{t}\exp\left\{-\frac{x}{\lambda}\right\} dx \quad = \quad \left[per\, partes: \begin{array}{cc} u = x^2 & v = -\lambda\exp\left\{-\frac{x}{\lambda}\right\} \\ u' = \frac{2x}{t} & v' = \exp\left\{-\frac{x}{\lambda}\right\} \end{array} \right]$$
   correct:
$$\int_0^t \frac{x^2}{t}\exp\left\{-\frac{x}{\lambda}\right\} dx \quad = \quad \left[per\, partes: \begin{array}{cc} u = \frac{x^2}{t} & v = -\lambda\exp\left\{-\frac{x}{\lambda}\right\} \\ u' = \frac{2x}{t} & v' = \exp\left\{-\frac{x}{\lambda}\right\} \end{array} \right]$$

10. page 11, line 19:
$$= \frac{2\lambda^3 - \exp\left\{-\frac{t}{\lambda}\right\}\lambda\left(t^2 + 2t\lambda 2\lambda^2\right)}{t}$$
    correct:
$$= \frac{2\lambda^3 - \exp\left\{-\frac{t}{\lambda}\right\}\lambda\left(t^2 + 2t\lambda + 2\lambda^2\right)}{t}$$

11. page 14, line 22:

$$= \exp\left\{ \frac{-y \cdot \frac{a}{p} + \ln\left(\frac{a}{p}\right)}{\frac{a}{p}} + p \cdot \ln(p) - \ln(\Gamma(p)) + (p-1)\ln(y) \right\}$$

correct:

$$= \exp\left\{ \frac{-y \cdot \frac{a}{p} + \ln\left(\frac{a}{p}\right)}{\frac{1}{p}} + p \cdot \ln(p) - \ln(\Gamma(p)) + (p-1)\ln(y) \right\}$$

12. page 14, line 24: where $\theta = \frac{p}{a}, \ldots$
correct: where $\theta = -\frac{a}{p}, \ldots$

13. page 15, line 2: ...and coefficients $\boldsymbol{\beta}_i$ that we would like to estimate:
correct: ...and coefficients $\boldsymbol{\beta}$ that we would like to estimate:

14. page 18, line 16: The of claims that were reported before the present moment t is
correct: The number of claims that occurred before the present moment t but were not reported before t is

15. page 19, relationship (1.11):

$$\mathrm{IBNER}_{d_i,d_i+1},\ \mathrm{IBNER}_{d_i+j,d_i+2}, \ldots, \mathrm{IBNER}_{s_{(j,i)}-1,s_{(j,i)}}\ .$$

correct:

$$\mathrm{IBNER}_{d_i,d_i+1},\ \mathrm{IBNER}_{d_i+1,d_i+2}, \ldots, \mathrm{IBNER}_{s_{(j,i)}-1,s_{(j,i)}}\ . \tag{1}$$

16. page 25, last line: ...for which the estimate is $\hat{\mu} = 0.1058$.
correct: ...for which the estimate is $\frac{1}{\hat{\mu}} = 0.1058$.

17. page 26, line 20: ...the estimate is $\hat{\mu} = 1.25$. ...
correct: ...the estimate is $\frac{1}{\hat{\mu}} = 1.25$. ...

18. page 31, line 5: ...intensity $\hat{\mu} = 0.105827$ for material claims and $\hat{\mu} = 1.25$ for health claims.
correct: ...intensity $\hat{\mu} = \frac{1}{0.105827}$ for material claims and $\hat{\mu} = \frac{1}{1.25}$ for health claims.

19. page 36, line 16: ... $\hat{\mu} = 0.1337$ ...
correct: ... $\hat{\mu} = \frac{1}{0.1337}$ ...

20. page 36, line 20: ... $\hat{\mu} = 0.1337$ ...
correct: ... $\hat{\mu} = \frac{1}{0.1337}$ ...

21. page 36, line 31: $\hat{\mu} = 1.458$
    correct: $\hat{\mu} = \dfrac{1}{1.458}$

22. page 36, line 34: $\ldots\,\hat{\mu} = 1.458\,\ldots$
    correct: $\ldots\,\hat{\mu} = \dfrac{1}{1.458}\,\ldots$

23. page 42, line 43: …and 181 170 16.5
    correct: …and 181 170 176.5

24. page 44, line 24: $\mu = 30$ days, which means that the time between two successive events is approximately one month.
    correct: $\mu = \dfrac{1}{30}$, which means that the expected value of time between two successive events is approximately one month.

25. page 45, table 4.8:

Sim.	Poisson process		Log-normal distribution	severity	Reporting delay	
	time window	$\hat{\mu}$	$\hat{\mu}$	$\hat{\sigma}$	λ_{obs}	$\hat{\lambda}$

correct:

Sim.	Poisson process		Log-normal distribution	severity	Reporting delay	
	time window	$\dfrac{1}{\hat{\mu}}$	$\hat{\mu}$	$\hat{\sigma}$	λ_{obs}	$\hat{\lambda}$

26. page 49, line 14: Endgland, P.
    correct: England, P.

27. page 49, additional items:
    Ross, M.S. *Stochastic processes.* Second Edition. John Wiley & Sons, Inc., New York, 1996. ISBN 04-711-2062-6.

    Drazek, L.C. *Intensity estimation for Poisson processes.* Leeds, 2013. Dissertation. The University of Leeds, School of Mathematics.