# CORRECTION NOTE TO PREDICTION OF OUTSTANDING LIABILITIES IN NON-LIFE INSURANCE, *AB* **23**, 95-115

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1. In (4.17) a factor $W$ is missing in the numerator of the expression in the middle.
2. The predictor of $X^{orns}$ proposed in Paragraph 5B is not unbiased in general as a simple counterexample will show. The proposed reserve on an individual *orns* claim with past history $T, U, V > v' = \tau - T - U, \{Y'(v''); 0 \leq v'' \leq v'\}$, is

$$R = E[Y|T, U, Y > Y'(v')] - Y'(v').$$

Suppose that $Y = V$ and $Y'(v'') = Q(v''/V)V, 0 \leq v'' \leq V$, where $Q$ is a non-decreasing, deterministic function on [0,1] such that $Q(0) = 0$ and $Q(1) = 1$. In this case $R = E[V|T, U, V > Y'(v')] - Y'(v')$. If $Q(s) > s$ for all $s \in (0,1)$, then $Y'(v') = Q(v'/V)V > v'$, hence

$$R \geq E[V|T, Y, V > v'] - Y'(v').$$

Now, the expression on the right here is an unbiased predictor, confer relation (4.3) and the related text in the follow-up paper Norberg (1999). Thus the proposed reserve is systematically too high. Similarly, if $Q(s) < s$ for all $s \in (0,1)$, then the proposed reserve is systematically too low.

My thanks are due to Svend Haastrup, who pointed out this problem. For a discussion by him, see Haastrup (1997).

## ADDITIONAL REFERENCES

HAASTRUP, S. (1997). *Some fully Bayesian micro models for claims reserving*. Ph.D. thesis, Laboratory of Actuarial Mathematics, University of Copenhagen.

NORBERG, R. (1999). Prediction of outstanding claims II: Model variations and extensions. *ASTIN Bull.* **29**, No. 1, 5-25.