

- PIERCE, J. A. (1943). Correction formulas for moments of a grouped-distribution of discrete variates. *J. Amer. Statist. Assoc.* **38** 57–62.
- PRATT, J. W. (1981). Concavity of the log-likelihood. *J. Amer. Statist. Assoc.* **76** 103–106.
- PREECE, D. A. (1981). Distribution of final digits in data. *The Statistician* **30** 31–60.
- PREKOPA, A. (1973). On logarithmic concave measures and functions. *Acta Sci. Math. (Szeged)* **34** 335–343.
- PRENTICE, R. L. and GLOECKLER, L. A. (1978). Regression analysis of grouped survival data with applications to breast cancer data. *Biometrics* **34** 57–67.
- RUBIN, D. B. (1978). Multiple imputation in sample surveys—a phenomenological Bayesian approach to nonresponse. *Proc. Survey Res. Methods Sec. Amer. Statist. Assoc.*, Washington.
- RUBIN, D. B. (1987). *Multiple Imputation for Nonresponse in Sample Surveys and Censuses*. Wiley, New York.
- SANDON, F. (1924). Note on the simplification of the calculation of abruptness coefficients to correct crude moments. *Biometrika* **16** 193–195.
- SCHADER, M. and SCHMID, F. (1984). Computation of maximum likelihood estimates for μ and σ from a grouped sample of a normal population. A comparison of algorithms. *Statist. Hefte* **25** 245–258.
- SELF, S. G. and GROSSMAN, E. A. (1986). Linear rank tests for interval-censored data with application to PCB levels in adipose tissue of transformer repair workers. *Biometrics* **42** 521–530.
- SHEPPARD, W. F. (1898). On the calculation of the most probable values of frequency constants for data arranged according to equidistant divisions of a scale. *Proc. London Math. Soc.* **29** 353–380.
- STEVENS, W. L. (1948). Control by gauging (with discussion). *J. Roy. Statist. Soc. Ser. B* **10** 54–98.
- STIRLING, W. D. (1984). Iteratively reweighted least-squares for models with a linear part. *Appl. Statist.* **33** 7–17.
- STOER, J. and BULIRSCH, R. (1980). *Introduction to Numerical Analysis*. Springer, New York.
- STUDENT (1908). The probable error of a mean. *Biometrika* **6** 1–25.
- SWAN, A. V. (1969). Algorithm AS 16. Maximum likelihood estimation from grouped and censored normal data. *Appl. Statist.* **18** 110–114.
- TALLIS, G. M. (1967). Approximate maximum likelihood from grouped data. *Technometrics* **9** 599–606.
- TALLIS, G. M. and YOUNG, S. S. (1962). Maximum likelihood estimation of parameters of the normal, log-normal, truncated normal and bivariate normal distributions from grouped data. *Austral. J. Statist.* **4** 49–54.
- TANNER, M. A. and WONG, W. H. (1987a). An application of imputation to an estimation problem in grouped lifetime analysis. *Technometrics* **29** 23–32.
- TANNER, M. A. and WONG, W. H. (1987b). The calculation of posterior distributions by data augmentation (with discussion). *J. Amer. Statist. Assoc.* **82** 528–540.
- THOMPSON, W. A. (1977). On the treatment of grouped observations in life studies. *Biometrics* **33** 463–470.
- TOCHER, K. D. (1949). A note on the analysis of grouped probit data. *Biometrika* **36** 9–17.
- TURNBULL, B. W. (1974). Nonparametric estimation of a survivorship function with doubly censored data. *J. Amer. Statist. Assoc.* **69** 169–173.
- TURNBULL, B. W. (1976). The empirical distribution function with arbitrarily grouped, censored and truncated data. *J. Roy. Statist. Soc. Ser. B* **38** 290–295.
- WACHTER, K. W. and TRUSSELL, J. (1982). Estimating historical heights. *J. Amer. Statist. Assoc.* **77** 279–293.
- WOLD, H. (1934). Sheppard's correction formulae in several variables. *Skandinavisk Aktuarietidskrift* **17** 248–255.
- WOLYNETZ, M. S. (1979a). Algorithm AS 138. Maximum likelihood estimation from confined and censored samples. *Appl. Statist.* **28** 185–195.
- WOLYNETZ, M. S. (1979b). Algorithm AS 139. Maximum likelihood estimation in a linear model from confined and censored normal data. *Appl. Statist.* **28** 195–206.
- YONEDA, K. and UCHIYAMA, M. (1956). Some estimations in the case of relatively large class intervals. *Yokohama Math. J.* **4** 99–118.

Comment

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Heitjan's paper is a useful and interesting survey of the current state of the art regarding "grouped data." Grouping is, as Heitjan says, "ubiquitous." Yet all of us have been brought up on statistical theory and methods intended to deal with "continuous" data—data that none of us will ever see! Justifications for such a perverse situation are of course that it is usually convenient to treat the data as if they were continuous and, often, that the grouping is fine enough for any necessary corrections to be ignorable. There

remains of course the grey area where it is not clear whether or not adjustments ought to be used. It is irritating in practice to have, on occasion, to worry about such things. Perhaps, in the near future hopefully, authors of statistical packages will enable us to analyze grouped data as a matter of routine. Certainly the continuing advances in computer processor power are making it increasingly feasible, if not desirable, to analyze the data that are actually observed. However, much of the conventional elegant theory of mathematical statistics may seem less compelling if we routinely adopt such a view: I wonder, for example, whether many results associated with sufficiency may ultimately be seen as mathematical curiosities or, at best, as approximations.

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