

Bibliography – Tutorials on Bayesian analysis in nuclear physics

Kenneth M. Hanson, Los Alamos National Laboratory

LANSCE, July 25-27, 2005

(tutorial slides at <http://public.lanl.gov/kmh/talks/>)

Least-Squares fitting

P. R. Bevington and D. K. Robinson, *Data Reduction and Error Analysis for the Physical Sciences* (Boston, McGraw-Hill, 1992); basic introduction to least-squares fitting

G. Cowan, *Statistical Data Analysis* (Oxford, Clarendon, 1998); thorough treatment of least-squares fitting with limited reference to Bayesian analysis

Bayesian analysis

G. D'Agostini, *Bayesian Reasoning in Data Analysis: A Critical Review*, (World Scientific, New Jersey, 2003)

G. D'Agostini, "Bayesian inference in processing experimental data: principles and basic applications," *Reports Prog. Physics* **66**, 1383-1419 (2003)

A. Gelman et al., *Bayesian Data Analysis* (London, Chapman&Hall, 1995)

T. Kawano et al., "Uncertainty quantification for applications of ^{239}Pu fission cross sections using a Monte Carlo technique," to be published in *Nuclear Science and Engineering* (2005)

D. Sivia, *Data Analysis: A Bayesian Tutorial* (Oxford, Clarendon, 1996); lucid pedagogical development of the Bayesian approach with an experimental physics slant

D. L. Smith, *Probability, Statistics, and Data Uncertainties in Nuclear Science and Technology* (Amer. Nucl. Soc., LaGrange Park, 1991)

Peelle's Pertinent Puzzle (PPP)

S. Chiba and D. L. Smith, *J. Nucl. Sci. Tech.*, **31**, 770–781 (1994).

K. M. Hanson, T. Kawano, and P. Talou, "Probabilistic interpretation of Peelle's pertinent puzzle and its resolution," *Proc. Int. Conf. Nuclear Data for Science and Technology*, R.C.Haight et al., eds., *AIP Conf. Proc.* **769**, pp. 304-307 (AIP, Melville, 2005)

S.-Y. Oh, "Box-Cox transformation for resolving Peelle's pertinent puzzle in curve fitting," IAEA, Vienna, 2003, pp. 146–158, INDC(NDS)-438

R. W. Peelle, *Peelle's Pertinent Puzzle*, informal ORNL memorandum, October 13, 1987.

V. G. Pronyaev, "Test and intercomparisons of data fitting with general least squares code GMA versus Bayesian code GLUCS," IAEA, Vienna, 2003, pp. 159–171, INDC(NDS)-438

D. L. Smith and V. G. Pronyaev, "Update of GMA code to solve the PPP problem (technically)," IAEA, Vienna, 2004, pp. 333–342, INDC(NDS)-453.

A. Zhao, A., and F. G. Perey, "Generation of covariance matrix for derived quantities and their least square fitting," in *Int. Symp. Nucl. Data Eval. Methodology*, C. L. Dunford, ed., pp. 657–662 (World Scientific, New Jersey, 1993)

Experimental uncertainties

C. Eisenhart, "Realistic evaluation of the precision and accuracy of instrument calibration systems," in *Precision Measurement and Calibration – Statistical Concepts and Procedures, NBS SP300, Vol. 1* (Gaithersburg, NBS, 1969)

S. Rabinovich, *Measurement Errors: Theory and Practice* (New York, AIP, 1995)

K. M. Hanson, "Inference about the plastic behavior of materials from experimental data," *Sensitivity Analysis of Model Output*, K. M. Hanson and F. M. Hemez, eds., pp. 126-136 (Los Alamos Research Library, 2005) <http://library.lanl.gov/ccw/samo2004/>

Outliers

J. F. Angers and J. Berger, "Robust hierarchical Bayes estimation of exchangeable means," *Canad. J. Statist.* **19**, 39-56 (1991)

G. E. P. Box and G. C. Tiao, "A Bayesian approach to some outlier problems," *Biometrika* **55**, 119-129 (1968)

B. DeFinetti, "The Bayesian approach to the rejection of outliers," in *Proc. 4th Berkeley Symp. Probability and Statistics*, vol. 1, 199-210 (Berkeley Univ., 1961)

V. Dose and W. von der Linden, "Outlier tolerant parameter estimation," *Maximum Entropy and Bayesian Methods*, von der Linden W et al., eds., 47–56 (Dordrecht: Kluwer Academic, 1999)

R. Fischer R, et al., "Background estimation in experimental spectra," *Phys. Rev.* **E61** 1152–1160 (2000)

F H Fröhner, "Bayesian evaluation of discrepant experimental data," *Maximum*

Entropy and Bayesian Methods, J Skilling, ed., 467–474 (Dordrecht: Kluwer Academic, 1989)

F H Fröhner, *Evaluation and Analysis of Nuclear Resonance Data*, 37–43, ISBN 92-64-18272-1 (place?: OECD Nuclear Energy Agency, 2000)

K. M. Hanson and D. R. Wolf, "Estimators for the Cauchy distribution," *Maximum Entropy and Bayesian Methods*, G. R. Heidbreder, ed., pp. 255-263 (Kluwer Academic, Dordrecht, 1996)

A. O'Hagan, "On outlier rejection phenomena in Bayes inference," *J. Roy. Statist. Soc. B* **41**, 358-367 (1979)

W.H. Press, "Understanding data better with Bayesian and global statistical methods," *Unsolved problems in astrophysics*, J. N. Bahcall and J. P. Ostriker, eds., 49–60 (Princeton, Princeton University, 1997)

D. S. Sivia, "Dealing with duff data," *MAXENT 96: Proceedings of the Maximum Entropy Conference*, M. Sears et al., eds., 131–137 (Port Elizabeth: N.M.B. Printers, 1996)

Monte Carlo

M. H. Kalos and P. A. Whitlock, *Monte Carlo Methods, Vol. I: Basics* (New York, Wiley-Interscience, 1986)

Markov Chain Monte Carlo

J. Besag et al., "Bayesian computation and stochastic systems," *Stat. Sci.* **10**, 3-66 (1995); MCMC applied to image analysis

A. Gelman et al, "Efficient Metropolis jumping rules," in *Bayesian Statistics 5*, J. M. Bernardo et al., (Oxford Univ., 1996); diffusion theory

W. R. Gilks et al., *Markov Chain Monte Carlo in Practice* (Chapman and Hall, 1996); excellent general-purpose book

J. E. Gubernatis, "The heritage," *The Monte Carlo Method in the Physical Sciences*, J. E. Gubernatis ed., *AIP Conf. Proc.*, vol. 690, 3 – 21 (API, 2003); an account of the beginning of MCMC

K. M. Hanson and G. S. Cunningham, "Posterior sampling with improved efficiency," *Proc. SPIE* **3338**, 371-382 (1998); includes introduction to MCMC

K. M. Hanson, "Inversion based on complex simulations," *Maximum Entropy and Bayesian Methods*, G. J. Erickson et al., eds., (Kluwer Academic, 1998); describes adjoint differentiation and its usefulness

K. M. Hanson, "Markov Chain Monte Carlo posterior sampling with the Hamiltonian method," *Medical Imaging: Image Processing*, M. Sonka and K. M. Hanson, eds., *Proc. SPIE* **4322**, pp. 456-467 (2001)

N. Metropolis, A. W. Rosenbluth, M. N. Rosenbluth, A. H. Teller, and E. Teller, "Equations of state calculations by fast computing machine," *J. Chem. Phys.* **21**, pp. 1087–1091 (1953)

R. M. Neal, *Bayesian Learning for Neural Networks*, (Springer, 1996); Hamiltonian hybrid MCMC

M.-D. Wu and W. J. Fitzgerald, "Bayesian multinodal evidence computation by adaptive tempered MCMC," in *Maximum Entropy and Bayesian Methods*, K. M. Hanson and R. N. Silver, eds., (Kluwer Academic, 1996); annealing

Quasi-Monte Carlo

Q. Du, V. Faber, and M. Gunzburger, "Centroidal Voronoi tessellations: applications and algorithms," *SIAM Review* **41**, 637-676 (1999); CVT

K. M. Hanson, "Quasi-Monte Carlo: halftoning in high dimensions," *Computational Imaging*, C. A. Bouman and R. L. Stevenson, eds., *Proc. SPIE* **5016**, pp. 161-172 (2003)

H. Niederreiter, *Random Number Generation and Quasi-Monte Carlo Methods*, (SIAM, 1992)