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Classic problems for probability. (English)

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The author presents 33 problems from probability theory and mathematical statistics. The problems relate to such central topics like the law of large numbers, the central limit theorem, the arcsin law and the various philosophies of probability connected with Bayes' paradigm. Also, problems and paradoxes less-known or seldom treated in probability courses are included, for example Bertrands chords or Benfords law. The problems are ordered according to the year of their first publication, which ranges from 1564 up to 1996. Every problem is firstly presented, then the solution is given and, in a discussion part, the history of this problem is described. The contributions of many mathematicians and other scientists to the solutions is acknowledged. These historical parts are very well investigated and full of interesting details. The author includes a surprising amount of literature for every problem from the beginning up to the newest recent publications. The size of the individual parts is different. It ranges from about twenty pages for the law of large numbers up to three pages for less central problems of probability theory. The mathematical level varies from mostly elementary up to levels demanding measure theoretical tools. Altogether, it is a wonderful illustration of the historical development of probability and statistics by well explained examples. Numerous parts of famous original manuscripts of essential publications are presented. About 50 photos of different authors are included. The understanding of the problems and their partially sudden solutions, as described in the book, make it easier to understand probability theory and statistics. Thus, the book can be highly recommend to every lecturer in this field and every student interested in probability and statistics. Also, teachers in schools will find suitable examples for classroom use. Here are the titles of the 33 problems:

1. Cardano and games of chance (1564), 2. Galileo and a discovery concerning dice (1620), 3. The Chevalier de Méré problem I: the problem of dice (1654), 4. The Chevalier de Méré problem II: the problem of points (1654), 5. Huygens and the gamblers ruin (1657), 6. The Pepys-Newton connection (1693), 7. Rencontres with Montmort (1708), 8. Jacob Bernoulli and his golden theorem (1713), 9. De Moivre's problem (1730), 10. De Moivre, Gauss and the normal curve (1730, 1809), 11. Daniel Bernoulli and the St.Petersburg problem (1738), 12. d'Alembert and the "croix ou pile" article (1754), 13. d'Alembert and the gambler's fallacy (1761), 14. Bayes, Laplace, and the philosophies of probability (1764, 1774), 15. Leibniz's error (1768), 16. The Buffon needle problem (1777), 17. Bertrand's ballot problem (1887), 18. Bertrand's strange three boxes (1889), 19. Bertrand's chords (1889), 20. Three coins and a puzzle from Galton (1894), 21. Lewis Caroll's pillow problem No. 72 (1894) , 22. Borel and a different kind of normality (1909), 23. Borel's paradoxon and Kolmogorov's axioms (1909, 1933), 24. Of Borel,

monkeys, and the new creationism (1913), 25. Kraitchik's, neckties and Newcomb's problem (1930, 1960), 26. Fisher and the lady tasting tea (1935), 27. Benford and the peculiar behaviour of the first significant digit (1938), 28. Coinciding birthdays (1939), 29. Lévy and the arc sine law (1939), 30. Simpson's paradox (1951), 31. Gamov, Stern, and elevators (1958), 32. Monty-Hall, cars and goats (1975), 33. Parrondo's perplexing paradox (1996).

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Classification :
  ∗60-03 Historical (probability theory)
   60A05 Axioms of probability theory
   01A05 General histories, source books
   97K50