

## A Bayesian Approach to Competing Risks Model with Masked Causes of Failure and Incomplete Failure Times

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### Abstract

We present a Bayesian approach for analysis of competing risks survival data with masked causes of failure. This approach is often used to assess the impact of covariates on the hazard functions when the failure time is exactly observed for some subjects but only known to lie in an interval of time for the remaining subjects. Such data, known as partly interval-censored data, usually result from periodic inspection in production engineering. In this study, Dirichlet and Gamma processes are assumed as priors for masking probabilities and baseline hazards. Markov chain Monte Carlo (MCMC) technique is employed for the implementation of the Bayesian approach. The effectiveness of the proposed approach is illustrated with simulated and production engineering applications.

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1. [Bayesian analysis for masked system failure data using non-identical Weibull models](#) Times Cited: 37  
By: Basu, S; Asit; Basu, P; et al.  
JOURNAL OF STATISTICAL PLANNING AND INFERENCE Volume: 78 Issue: 1-2 Pages: 255-275 Published: MAY 1 1999
2. [Bayesian analysis of competing risks with partially masked cause of failure](#) Times Cited: 30  
By: Basu, S; Sen, A; Banerjee, M  
JOURNAL OF THE ROYAL STATISTICAL SOCIETY SERIES C-APPLIED STATISTICS Volume: 52 Pages: 77-93 Part: 1 Published: 2003
3. [Simulating competing risks data in survival analysis](#) Times Cited: 95  
By: Beyersmann, Jan; Latouche, Aurelien; Buchholz, Anika; et al.  
STATISTICS IN MEDICINE Volume: 28 Issue: 6 Pages: 956-971 Published: MAR 15 2009
4. [Inference for the dependent competing risks model with masked causes of failure](#) Times Cited: 24  
By: Craiu, RV; Reiser, B  
LIFETIME DATA ANALYSIS Volume: 12 Issue: 1 Pages: 21-33 Published: MAR 2006
5. [NONPARAMETRIC PREVALENCE AND MORTALITY ESTIMATORS FOR ANIMAL-EXPERIMENTS WITH INCOMPLETE CAUSE-OF-DEATH DATA](#) Times Cited: 58  
By: DINSE, GE  
JOURNAL OF THE AMERICAN STATISTICAL ASSOCIATION Volume: 81 Issue: 394 Pages: 328-336 Published: JUN 1986
6. [Parametric modeling for survival with competing risks and masked failure causes](#) Times Cited: 23  
By: Flehinger, BJ; Reiser, B; Yashchin, E  
LIFETIME DATA ANALYSIS Volume: 8 Issue: 2 Pages: 177-203 Published: JUN 2002
7. [Dependent masking and system life data analysis: Bayesian inference for two-component systems.](#) Times Cited: 38  
By: Guttman, I; Lin, D K; Reiser, B; et al.  
Lifetime data analysis Volume: 1 Issue: 1 Pages: 87-100 Published: 1995
8. [Survival Analysis of Coal Workers' Pneumoconiosis \(CWP\) Patients in a State-Owned Mine in the East of China from 1963 to 2014](#) Times Cited: 9  
By: Han, Lei; Gao, Qianqian; Yang, Jingjin; et al.  
INTERNATIONAL JOURNAL OF ENVIRONMENTAL RESEARCH AND PUBLIC HEALTH Volume: 14 Issue: 5 Article Number: 489 Published: MAY 2017
9. [WEIBULL ACCELERATED LIFE TESTS WHEN THERE ARE COMPETING CAUSES OF FAILURE](#) Times Cited: 38  
By: KLEIN, JP; BASU, AP  
COMMUNICATIONS IN STATISTICS PART A-THEORY AND METHODS Volume: 10 Issue: 20 Pages: 2073-2100 Published: 1981
10. [Bayesian reliability modeling for masked system lifetime data](#) Times Cited: 33  
By: Kuo, L; Yang, TY  
STATISTICS & PROBABILITY LETTERS Volume: 47 Issue: 3 Pages: 229-241 Published: APR 15 2000
11. [Increased Risk of Stroke in Patients of Concussion: A Nationwide Cohort Study](#) Times Cited: 5  
By: Liu, Shih-Wei; Huang, Liang-Chung; Chung, Wu-Fu; et al.  
INTERNATIONAL JOURNAL OF ENVIRONMENTAL RESEARCH AND PUBLIC HEALTH Volume: 14 Issue: 3 Article Number: 230 Published: MAR 2017
12. [Multiple imputation methods for estimating regression coefficients in the competing risks model with missing cause of failure](#) Times Cited: 75  
By: Lu, KF; Tsiatis, AA  
BIOMETRICS Volume: 57 Issue: 4 Pages: 1191-1197 Published: DEC 2001