Partition Based Nonparametric Priors

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Abstract: Failure data, in Reliability and Survival analysis, may consist of exactly observed failure times or censored failure times or failure times restricted by previous failure times. The first case is usually referred to as complete observations. The second case occurs when there are censoring random variables. The third case occurs when repairs to a system restrict the range of the failure times to sets based on previous failures.

For repair models, when the data consists of X with a distribution P restricted to a set A depending on previous failure times, Sethuraman and Hollander introduced a class of priors called *Partition Based* **PB** priors for P and showed that the posterior distributions are also **PB** distributions. They also show how to simplify the calculations when using Dirichlet priors. We will summarize some of these results.

The second situation occurs in survival analysis and covers all kinds of censoring. The exact value of the failure time X is not known, but is only known to belong to a set A. In this talk, we will show that the same class of **PB** priors are the natural priors in this problem. This simplifies and clarifies previous work on Bayes methods in survival analysis.