[1]张云安,明志茂,陶俊勇,等.基于非齐次Poisson过程的多阶段可靠性增长Bayes评估研究[J].弹箭与制导学报,2009,4:209.

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基于非齐次Poisson过程的多阶段 可靠性增长Baye

Title: Research on Bayesian Assessment of Reliability Growth Test during Multi‑stage Development Base on Non‑homogeneous Poisson Process

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摘要： 针对航空航天领域试验费用昂贵、试验数据少的问题，研究了多阶段可靠性增长Bayes分析方法。采 用非齐次Poisson过程（NHPP）建立可靠性增长模型;利用Bayes方法融合专家信息，并根据可靠性增长的特 点采用Gamma‑Beta分布作为NHPP参数的先验分布，通过阶段间可靠性增长信息传递的方法，实现多阶段 的可靠性增长评估。最后通过一个发动机的例子表明该方法和模型能够充分利用多阶段的专家经验和试验数据，适合小子样场合的可靠性增长评估。

Abstract: A Bayesian approach for multi‑stage reliability growth test was proposed aiming at the test process which was high cost and small sample‑size in aerospace filed. The reliabili ty growth process was modeled by the non‑homogeneous Poisson process （NHPP），and a Gamma‑Beta prior was proposed for the parameter of NHPP corresponding to the reli‑ ability growth process. The model was suitable for multi‑stage reli ability growth test assessment by the transfer rule for reliability growth's information. The analysis result of a motor p roved that the model was able to make full use of the expert's experience and the test data during multi‑stage develop ment，and was suitable for multi‑stage reliability growth test assessment with small sample size.

参考文献/REFERENCES

［1］ 梅文华，陈家鼎. 可靠性增长试验［M］.北京:国防 工业出版社，2003.

［2］ Guida M，Pulcini G. Bayesian reliability assess‐ ment of repairable systems during multi‐stage de‐ velopment programs［J］.IIE Transactions. 2005， 37（11）:1071-1081.

［3］ 张金槐，唐雪梅. Bayes方法［J］.修订版. 长沙:国 防科技大学出版社，1993.

［4］ Guida M，Pulcini G. Bayesian reliability‐growth modeling of repairable mechanical systems［C］// Proceedings of the 3rd International Conference on Mathematical Methods in Reliability‐MMR2002， Trondheim（Norway），2002:263-266.