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考虑预防保养之 $\bar{X}$ 管制图经济-统计设计

The Economic-Statistical Design of X̄ Control Charts under Preventive Maintenance

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关键词：

X̄ 管制图； 经济-统计设计； 预防保养； X̄ Control Chart； Statistical-Economic Design； Preventive Maintenance

摘要：

自动化生产设备已逐渐取代人力生产，因而在制造的过程中，对自动化生产设备加以保养，可有效提升产品质量并降低生产成本。传统上，制程常透过管制图的监控以及早发现异常。但传统的管制图未考虑到经济层面，故发展出管制图的经济设计。管制图的经济设计虽然可以得到较低的成本，但在型I误差和检定力的统计特性方面表现并不好，故将两者结合以弥补彼此的不足。然一般管制图设计也未考虑到机器设备之预防保养，故本研究考虑机器设备之预防保养情形下，加入统计条件限制，建立 $\bar{X}$ 管制图经济统计分析模型，并找出管制图经济–统计设计参数值。

Human power has gradually replaced by automated production equipment. Therefore, during the production process, maintaining the automated production equipment in order to reduce any production variations can effectively increase product quality and lower production costs. A traditional control chart is designed on the basis of statistics. An economic control chart may achieve a lower cost, but it does not perform well in some statistic features, so the two are combined in order to compensate each other. Even so, the design of a general control chart does not consider the preventive maintenance of machine equipment. Therefore, the economic-statistical design of X̄ control chart is developed under a consideration of the preventive maintenance of machine equipment in this study. Numerical example is also used to demonstrate the model's working.

参考文献

[1]　Duncan, A.J. (1956) The Economic Design of Charts Used to Maintain Current Control of a Process.

Journal of the American Statistical Association, 51, 228-242.

[2]   Woodall, W.H. (1986) Weaknesses of the Economic Design of Control Charts. Technometrics, 28, 408-409.

[3]   Saniga, E.M. (1989) Economic Statistical of Control-Chart Designs with an Application to and R Charts. Technometrics, 31,313-320.

[4]   Montgomery, D.C, Torng J.C, Cochran J.K and Lawrence F.P. (1995) Statistically Constrained Economic Design of the EWMA Control Chart. Journal of Quality Technology, 27, 250-256.

[5]   Zhang, G. and Berardi, V. (1997) Economic Statistical Design of Control Charts for Systems with Weibull In-Control Times. Computers and Industrial Engineering, 32, 575-586.

[6]   Lotka, A.J.(1939) A Contribution to the Theory of Self-Renewing Aggregates with Special Reference to Industrial Replacement. Annals of Mathematical Statistics, 10, 1-25.

[7]   Barlow, R.E and Hunter, L.C. (1960) Optimum Preventive Maintenance Policies. Operations Research, 8, 90-100.

[8]   Ben-Daya, M. and Rahim, M.A. (2000) Effect of Maintenance on the Economic Design of Control Chart. European Journal of Operational Research, 120, 131-143.

[9]   钟佳桦 (2003) 考虑预防保养之变动样本数与抽样间隔 管制图经济性设计. 云林科技大学工业工程与管理研究所硕士论文.

[10]   Lorenzen, T.J and Vance, L.C. (1986) The Economic Design of Control Charts: A Unified Approach. Technometrics, 28, 3-10.

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