

CG036

QUALITY CONTROL
Room Sala 7

Chair: Benjamin Reiser

CC0482: Variable selection with pre-assigned roles and cost utility analysis for process monitoring*Presenter:* Luan Jaupi, CNAM, France

Methods for selecting a reduced number of relevant variables for process monitoring are proposed. We assume that a two-class system is used to classify the variables as primary and secondary based on different criteria. Then a double reduction of dimensionality is applied to select relevant primary variables that represent well the whole set of variables. The selection methodology uses external information and a cost-utility analysis to influence the selection process and compare one use of resources with other possible uses. The subset of relevant variables is selected in a manner that retains, to some extent, the structure and information carried by the full set of original variables. The advantages of the methods are illustrated with simulation results and a real application from automotive industry.

CC0426: A new EWMA chart for monitoring the covariance matrix of a multivariate process based on dissimilarity index*Presenter:* Longcheen Huwang, National Tsing Hua University, Taiwan

An EWMA chart is proposed for monitoring the covariance matrix of a multivariate process based on the dissimilarity index of two matrices. The conventional charts for monitoring the covariance matrix of a multivariate process are either based on comparing the sum or the product or both of the eigenvalues of the estimated covariance matrix with those of the in-control covariance matrix. In contrast, the proposed new chart essentially monitor the covariance matrix by comparing the individual eigenvalues of the estimated covariance matrix with those of the in-control counterpart. We compare the performance of the proposed chart with that of the best existing chart in the multivariate normal process. Simulation results show that the proposed EWMA chart outperforms the best existing multivariate EWMA chart for monitoring the covariance matrix. Further, to guarantee

approaches is analyzed. Since the evaluation of predictive performance and the suitability of the model are important issues, the probabilistic forecast is compared with the true data-generating distribution. This comparison is made using the Probability Integral Transform (PIT) and applied to real data sets of E.coli infections and meningitis cases.

CC0584: Web computing of robust methods in Acceptance Sampling for Weibull variables*Presenter:* Miguel Casquilho, University of Lisbon, Portugal*Co-authors:* Elisabete Carolino, Rosario Ramos, Isabel Barao

Acceptance sampling (AS) is used to inspect the input or output of a process, mainly in manufacturing. A sampling plan is designed to determine a procedure that, if applied to a series of lots of a given quality and based on sampling information, leads to a specified risk of accepting or rejecting the lots. Classic AS by variables assumes Gaussian distribution, as treated in industry standards, which is sometimes an abusive assumption leading to wrong decisions. AS for variables with asymmetric and/or heavy tailed distributions is then a relevant topic. Specific AS plans are derived for the case of the Weibull distribution. As an alternative to these AS plans for the Weibull, traditional plans are used with robust estimators. The estimators are the sample median for location and a modified version of the sample standard deviation and the Total Range for scale estimates. The problem of determining AS plans by variables is addressed for the Weibull distribution with unknown parameters. The aim is to apply computing over the Web, through an application made available to any user, needing no software installation, in order to conduct a simulation study on these methods, about classical plans, specific plans and plans using the robust estimates for location and scale

CC0386: A modified control chart for monitoring the multihead weighing process*Presenter:* Alexander Pulido-Rojano, Universidad Simon Bolivar, Colombia*Co-authors:* Juan Carlos Garcia-Diaz

The modified control charts are used for monitoring and control of the manufacturing processes which are considered as six-sigma process, ensuring a probability of out-of-specification product acceptably small. The use of these charts is based on the idea that the cost of identifying and correcting special causes is much higher than the cost of off-target products. Therefore, the process mean is essentially acceptable as long as it is anywhere within the specification limits. These concepts have been applied to the packaging process in multihead weighers. The weight of the packed product, seen as the quality characteristic to be monitored, must be as close to a specified target weight and comply with applicable regulations. In order to design the modified control chart and comply with requirements for its implementation, the packaging process has been previously optimised and improved through a packaging strategy. The strategy seeks to reduce the variability in the selection of the total weight of the package and it is evaluated through a proposed packing algorithm. In this way, a set of numerical experiments were conducted to examine the solutions generated and which are subsequently monitored.