

Department of Industrial Systems Engineering & Management, NUS, Singapore

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A Distribution-Free Control Chart for the Monitoring of Process Variability

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Date: 09 Jul 2018 (Monday)

Time: 4:00 p.m. to 5:00 p.m.

Venue: E1-07-21, Faculty of Engineering, NUS

Abstract: Control charts are effective tools for signal detection in both manufacturing processes and service processes. Much of the data in service industries come from processes exhibiting non-normal or unknown distributions. The commonly used traditional variable control charts, which depend heavily on the normality assumption, are not appropriately used here. This paper thus proposes a DS EWMA-AV control chart for monitoring process variability. We further explore the sampling properties of the new monitoring statistics, and calculate the average run lengths when using the proposed DS EWMA-AV chart. The performance of the DS EWMA-AV control chart and those of non-parametric variance charts by considering cases in which the critical quality characteristic presents a normal and non-normal distribution are compared. Comparison results show that the proposed chart always outperforms the latter.

Biography: Su-Fen Yang is a Professor of the Statistics Department at the National Chengchi University in Taiwan. She received a Ph.D. in Statistics from the University of California, Riverside, CA, USA. She is the author of one book on Quality Management and of more than 150 articles published in international journals and conferences. Professor Yang has been a recipient of outstanding research from National Chengchi University and the Ministry of Science and Technology (MOST), Taiwan. She has served as the Department Head, the Quality Management Committee of the Ministry of Economic Affairs Bureau of Standards, Taiwan; Committee of Chinese Society for Quality; an Associate Editor for Journal of Quality and JCIIE. She has reviewed many papers for many international journals. Her research interests are mainly in statistical process control, quality engineering, and probability models.

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