



جلسه ارائه علمی دانشکده مهندسی صنایع

## Profile Monitoring in Multistage Processes

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### Abstract

Nowadays due to the advancement in technology, most of the production processes consist of several dependent stages and the quality characteristics of products at each stage depends not only on the operation at the current stage but also to the quality characteristics at the upstream stages. In other words, the disturbance in the quality characteristics of each stage would propagate to the downstream stages and affects the quality of the products at downstream stages. This property is referred to as the cascade property of multistage processes. However, the most of the conventional SPC tools were developed based on the assumption of processes with single stage or processes with multiple independent stages and hence these stages have been monitored separately. Investigations on this subject show that ignoring this effect may lead to misleading monitoring results to identify the true state of processes and the stages responsible for out-of-control conditions. On the other hand, there are some situations where the quality of a process or product is characterized better by a relationship between a response variable and one or more explanatory variables. This relationship is referred to as profile. In this case, the quality of process is monitored by controlling and monitoring profiles over time in which, instead of comparing the process mean with control limits, a regression relationship to be controlled with the corresponding control limits. To do this, the profile parameters are monitored over time and if the parameters are in control, then the profiles are identical and hence the process is in statistical control. Although both the subjects have received great attention, however, monitoring profiles in multistage processes is an important problem with applications in real world in which it has a poor and limited literature. Therefore, we investigate this problem and propose some approaches for monitoring profiles in multistage processes in which the quality of process in each stage is described by profiles and the cascade property of multistage processes has been taken into account.

### Biography

Majid Khedmati is a lecturer in the department of Industrial Engineering at Sharif University of Technology. He holds a Ph.D. in Industrial Engineering from Sharif University of Technology. He received his M.Sc. and B.Sc. both in Industrial Engineering from Sharif University of Technology and Iran University of Science and Technology, respectively. His research interests include quality engineering, applied statistics, statistical process control, data mining and time series analysis.