

INTISARI

Grafik Pengendali *Mixed Cumulative Sum-Exponentially Weighted Moving Average* (MCE) : Analisis Efektif dalam Pengawasan Proses Produksi

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Dalam proses produksi diperlukan adanya teknik dan manajemen untuk memantau hasil produksi. Dengan adanya proses pemantauan, proses produksi akan menghasilkan keluaran yang sesuai dengan target standar sehingga target kepuasan konsumen terjaga. Untuk itu perlu adanya aplikasi ilmu statistika yang berguna untuk menganalisis permasalahan kualitas produksi. Pengendalian kualitas statistik dapat dengan cepat menyidik terjadinya sebab-sebab terduga atau pergeseran proses. Analisa pergeseran proses tersebut akan menjadi fokus tindakan pembetulan dalam pengawasan produksi. Metode grafik pengendali yang akan dibahas kali ini adalah metode *Cumulative-Sum* (CUSUM), *Exponentially Weighted Moving Average* (EWMA), dan *Mixed CUSUM-EWMA* (MCE). Metode *Mixed CUSUM-EWMA* (MCE) akan menjadi fokus pembahasan.

Mixed CUSUM-EWMA (MCE) adalah perpaduan antara metode *Cumulative-Sum* dan *Exponentially Weighted Moving Average*. Perpaduan CUSUM dan EWMA bertujuan menambah kesensitifitasan grafik pengendali dalam mendeteksi kejadian *out of control*. Untuk membandingkan tingkat kesensitifitasan metode CUSUM, EWMA, dan MCE digunakan *Average Run Length* (ARL). Dari perbandingan nilai ARL diperoleh grafik pengendali MCE sebagai grafik pengendali dengan tingkat kesensitifitasan tertinggi dibandingkan dengan metode CUSUM dan EWMA. Hasil perbandingan tersebut didukung dengan studi kasus yang memberikan hasil analisis grafik *Mixed CUSUM-EWMA* lebih cepat mendeteksi adanya kejadian *out of control* dibandingkan dengan metode CUSUM dan EWMA.

Kata kunci : grafik pengendali, *cumulative sum*, *exponentially weighted moving average*, *mixed CUSUM-EWMA*, CUSUM, EWMA, MCE, *average run length*, ARL.

ABSTRACT

Mixed Cumulative Sum-Exponentially Weighted Moving Average (MCE) Control Charts : An Effective Aanalysis for Monitoring Production Poces

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In the process of production, technical and management are needed to monitor output's production. With the monitoring process, the production process will produce output in accordance with standard targets, and the satisfaction's costomer is maintained. So, we need application of statistics that is useful to analyze the production quality problem. Statistic quality control can quickly investigate the expected causes or shifting process. The analysis of process will be a focus corrective in production monitoring. Control charts methods that will be discussed is *Cumulative-Sum* (CUSUM) method, *Exponentially Weighted Moving Average* (EWMA) method, and *Mixed CUSUM-EWMA* (MCE) method. The *Mixed CUSUM-EWMA* (MCE) method will be the focus of discussion.

Mixed CUSUM-EWMA (MCE) is a combination of methods *Cumulative-Sum* (CUSUM) and *Exponentially Weighted Moving Average* (EWMA). The combination of CUSUM and EWMA have purpose to increase the sensitivity of control chart in detecting out of control event. To compare the level of sensitifity from CUSUM, EWMA, and MCE methods is used *Average Run Length* (ARL). From the process comparison the value of ARL, we get that control chart with MCE method as graphic controller with highest level of sensitivity compared with CUSUM and EWMA methods. The result of comparison are supported by case studies that provide if the control chart with *Mixed CUSUM-EWMA* (MCE) method more quickly detect the out of control event instead of the CUSUM and EWMA methods.

Keywords : control chart, *cumulative sum*, *exponentially weighted moving average*, *mixed CUSUM-EWMA*, CUSUM, EWMA, MCE, *average run length*, ARL.