INTISARI

Grafik Pengendali *Hybrid Exponentially Weighted Moving Average (HEWMA)* : Analisis Pergeseran *Mean* Proses

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Pengendalian kualitas statistika berperan penting terhadap pemantauan proses produksi suatu perusahaan. Selama proses produksi, ketidaksesuaian barang, produksi di luar target perusahaan dapat terjadi karena beberapa faktor, diantaranya bahan baku, operator, mesin, lingkungan, ukuran, dan metode. Oleh karena itu diperlukan alat statistika untuk mendeteksi pergeseran atau sebab – sebab terduga yang terjadi selama proses produksi. Semakin cepat sebab – sebab terduga dideteksi maka tindakan perbaikan dapat segera dilakukan agar produksi dapat kembali stabil. Grafik pengendali *Cummulative Sum* (CUSUM) dan *Exponentially Weighted Moving Average* (EWMA) dikenal efektif dalam mendeteksi pergeseran *mean* proses yang kecil. Metode grafik pengendali yang akan dibahas kali ini yaitu grafik pengendali *Cummulative Sum* (CUSUM), *Exponentially Weighted Moving Average* (EWMA) dan *Hybrid Exponentially Weighted Moving Average* (HEWMA) dengan fokus pembahasan pada grafik pengendali *Hybrid Exponentially Weighted Moving Average* (HEWMA).

Grafik pengendali *Hybrid Exponentially Weighted Moving Average* (HEWMA) adalah penggabungan dua grafik pengendali *Exponentially Weighted Moving Average* (EWMA). Kelebihan dari grafik pengendali *Hybrid Exponentially Weighted Moving Average* (HEWMA) adalah mempunyai dua parameter λ yaitu λ_1 dan λ_2 yang membuat grafik pengendali *Hybrid Exponentially Weighted Moving Average* (HEWMA) lebih sensitif mendeteksi pergeseran *mean* proses yang kecil. *Average Run Lengths* (ARL) digunakan untuk mengevaluasi kesensitifitasan antara grafik pengendali CUSUM, EWMA dan HEWMA. Nilai ARL menunjukkan bahwa grafik pengendali HEWMA lebih sensitif daripada grafik pengendali CUSUM dan EWMA. Kesensitifitasan dari grafik pengendali *Hybrid Exponentially Weighted Moving Average* (HEWMA) didukung oleh performa grafik pengendali HEWMA yang lebih cepat mendeteksi kejadian di luar kendali (*out of control*).

Kata kunci : Grafik Pengendali, *cummulative sum, exponentially weighted moving average*, *hybrid exponentially weighted moving average, average run lengths*, parameter λ, CUSUM, EWMA, HEWMA, ARL.

ABSTRACT

Hybrid Exponentially Weighted Moving Average (HEWMA) Control Chart :
An Analysis for Process Mean Shifts

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     Statistical quality control have an important role to monitoring production process in company. During production process, the number of defectives and production out from the target may result because some factors include material, personnel, machine, envirement, measurement, and method, so, statistical tools are needed to detect shifting or assured causes during process production. When assured causes are detected quickly then corrective action could be done quickly, so production will stabilize. Cummulative Sum (CUSUM) control chart and Exponentially Weighted Moving Average (EWMA) control chart has known to detects small process mean shifts. Control charts that would discussed now are Cummulative Sum, Exponentially Weighted Moving Average, and Hybrid Exponentially Weighted Moving Average (HEWMA). The Hybrid Exponentially Weighted Moving Average (HEWMA) control chart will be the focus of discussion.

     Hybrid Exponentially Weighted Moving Average (HEWMA) control chart is proposed by mixing two Exponentially Weighted Moving Average (EWMA) control charts. The advantages of Hybrid Exponentially Weighted Moving Average (HEWMA) control chart is have two parameter λ, those are λ_1 and λ_2, that makes Hybrid Exponentially Weighted Moving Average (HEWMA) control chart more sensitive. Average Run Lengths (ARL) is used to evaluate sesitivity between CUSUM control chart, EWMA control chart and HEWMA control chart. ARL value shown that HEWMA control chart is more sensitive than CUSUM control chart and EWMA control chart. Sensitivity of Hybrid Exponentially Weighted Moving Average (HEWMA) is supported by performance of HEWMA control chat that quickly to detect out of control events.

Keywords : Control Chart, cummulative sum, exponentially weighted moving average, hybrid exponentially weighted moving average, average run lengths, parameter λ, CUSUM, EWMA, HEWMA, ARL.