

ABSTRAK

DETEKSI MODA *INTERAREA OSCILLATION* DAN ESTIMASI *DAMPING RATIO* DENGAN METODE *COMPLEX MORLET CWT* STUDI KASUS SISTEM INTERKONEKSI JAWA BALI

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Osilasi sistem tenaga merupakan permasalahan kestabilan sistem tenaga dinamis. Kestabilan sistem tenaga dinamis yang tidak diantisipasi secara dini dapat menyebabkan terjadinya *blackout*. Metode *Complex Morlet Wavelet Transform* digunakan untuk mendeteksi kestabilan sistem dinamis karena memiliki kemampuan untuk melokalisir informasi waktu dan frekuensi secara bersamaan. Pengujian metode *Complex Morlet Wavelet Transform* dilakukan terhadap sinyal sistesis dengan parameter yang sudah diketahui. Hasil estimasi metode *Complex Morlet Wavelet Transform* juga dibandingkan terhadap hasil perhitungan dengan metode nilai eigen pada model *Two Area Four Machine System* untuk memvalidasi metode yang digunakan.

Metode *Complex Morlet Wavelet Transform* digunakan untuk mendeteksi moda *interarea oscillation* dan estimasi *damping ratio* pada sistem interkoneksi Jawa-Bali. Dari hasil estimasi, sistem interkoneksi Jawa-Bali memiliki moda *interarea oscillation* sekitar 0.5 Hz dan 0.83 Hz serta memiliki *damping ratio* terendah hingga di bawah 3%.

Kata kunci : *interarea oscillation*, estimasi *damping ratio*, *complex morlet wavelet*, sistem interkoneksi Jawa-Bali, kestabilan dinamis.

ABSTRACT

INTERAREA OSCILLATION MODE DETECTION AND DAMPING RATIO ESTIMATION WITH COMPLEX MORLET CWT METHOD STUDY CASE JAWA BALI INTERCONNECTION SYSTEM

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Power system oscillation is a problem of power system dynamic stability. Power systems dynamic stability that is not anticipated early can cause a blackout. The Complex Morlet Wavelet Transform method was used to detect system dynamic stability owing to its ability to localize time and frequency information simultaneously. The verification of the Complex Morlet Wavelet Transform approach was performed on the synthesized signal with known parameters. The estimation results of the technique were also compared to the results of calculations with the eigenvalue method in the Two Area Four Machine System model to validate the result.

The Complex Morlet Wavelet Transform approach was used to detect interarea oscillation mode and damping ratio estimation in the Java-Bali interconnection system. From the estimation results, the Java-Bali interconnection system has an interarea oscillation mode of around 0.5 Hz and 0.83 Hz and has the lowest damping of about close to 3%.

Keywords : interarea oscillation, damping ratio estimation, complex morlet wavelet, Jawa-Bali interconnection system, dynamic stability.