

https://dspace.org/

The use of empirical mode decomposition (EMD) and variable length boostrap (VLB) for stochastic rainfall generation

Nyaga, Muriithi Job

2015-05-07
http://hdl.handle.net/10539/17668

Downloaded from a DSpace repository. https://dspace.org/

ABSTRACT

This Research Report sets out to find out how the use of Empirical Mode Decomposition (EMD) for block selection impacts on the performance of the Variable Length Bootstrap (VLB) stochastic rainfall generator. Empirical Mode Decomposition (EMD), a relatively new data-adaptive approach, decomposes a time series into a group of component time series' termed Intrinsic Mode Functions (IMFs) that are considered to quantify the impact of the multiple physical processes that affect the variability in the original time series. Therefore using IMFs may be better than the subjective method currently used in the VLB for block determination. The performance of the resulting model is tested by comparing historic with generated rainfall statistics using a 10-site rainfall generator problem. The hybrid EMD-VLB model is further compared with the standard VLB model using 8 statistics. The EMD-VLB generator is found to replicate the statistics at par with the VLB generator on a monthly time scale while the standard VLB model performs better on a yearly time scale.