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Tze-Chien Sun and **Jinfeng Wei*** (jinfeng@math.wayne.edu), 656 W. Kirby FAB1150,
Detroit, MI 48202. *Statistical Modeling of Terrain Profiles.*

In this paper we shall use the time series to model the terrain profiles. We receive data from the Belgian Block and the Perryman3 testing Tracks. The Belgian Block data are tested to be linear, Gaussian and nonstationary. We have shown that they behave like a uniformly modulated process developed by M. Priestly, i.e. it is the product of a deterministic function and a stationary process. The modeling of the profiles can be done by estimating the deterministic function and fit the stationary process with a well-known ARMA model. The Perryman3 data are more irregular and are tested to be nonlinear, non-Gaussian and nonstationary. Here we use the intrinsic mode function(IMF) decomposition method developed by N.E. Huang and others. The first few intrinsic mode functions are found to be Gaussian and linear which could be all modeled in the same way as the the Belgian Block data. The non-Gaussian nature of the data is contained mostly in the residue part. However the residue part is a very smooth function which we may consider as a deterministic function and we can approximate by a spline. The sum of the models for the intrinsic mode functions and the residue part will be used as model for the terrain profile. (Received September 21, 2006)