# Non-linearity detection by the noise titration technique : another tool dependent on the choice of the observable

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Identifying chaotic dynamics from biological data is very challenging, mainly because it requires a conclusive proof for an underlying determinism. Even if deterministic models were already found from experimental data, they are very rarely obtained from biological data [1]. If proving chaos is more or less out of scope, it remains possible to detect the action of a nonlinearity in the processes governing the dynamics under investigation. The noise titration technique developed by Mauricio Barahona and Chi-Sang Poon [2] is based on the comparison of one-step-ahead predictions using linear and nonlinear models, respectively. We show that this technique has to be used in right conditions, that is, to be applied on well sampled data and using models with appropriate structures. Moreover, the noise titration technique is shown to depend on the choice of the observable with the Rössler system used as a test case.

[1]. U. S. Freitas, E. Roulin, J.-F. Muir & C. Letellier, Identifying determinism underlying heart rate: the right task ?, Chaos, 19, 028505 (2009).

[2]. C.-S. Poon & M. Barahona, Titration of chaos with added noise, Proceedings of the National Academy of Sciences (USA), 98, 7107-7112, 2001.