**Deterministic vs. Stochastic Model Comparison for QSO**

1. **Papers**

Andrae, Rene & Kim, Dae-Won & Bailer-Jones, Coryn. (2013). Assessment of stochastic and deterministic models of 6304 quasar lightcurves from SDSS Stripe 82. Astronomy and Astrophysics. 554. 137-. 10.1051/0004-6361/201321335.

1. **Abstract**

The variation of QSO cannot be described well by simple deterministic model. This paper performs a Bayesian comparison of over 20 deterministic and stochastic models on QSO light curves in SDSS Stripe 82. This paper includes the damped-random walk model (OU model), multiple OU process, single and double sinusoids, higher order continuous autoregressive processes and composite models.

The finding is that only out of QSO light curves are described significantly better by deterministic models than a stochastic one. The OU process is an adequate description of the vast majority of the cases. Indeed, the OU process is the best single mode for light curves, with the composite OU process / sinusoid model being the best in cases. The latter model is the dominant one for brighter/bluer QSOs. Furthermore, a non-negligible fraction of QSO light curves show evidence that not only the mean is stochastic, but the variance is stochastic, too.

In conclusion, the result confirms that QSO light curves can be described with a stochastic model, and further show that the OU process is preferred over several other stochastic and deterministic models.