In spring 2018 I shall read in NCAC a monograph lecture course on

Statistics of Astronomical Time Series

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Though there is nothing special in math and physics application in astronomy, time series in our field differ much from other fields, hence a specialized approach is justified. Namely time series encountered in astronomy while often sampled unevenly in time also suffer from periodic gaps due to day, moon and season cycles. Hence rich literature on analysis of even sampled signals, amounting to over 1500 books, offers less guidance for astronomers. Lecture topics are biased by my experience. After some math intro I shall discuss Fourier transform, more to explain sampling interference than as an analysis tool. Than I shall discuss fitting data with models, in particular orthogonal ones and suitable for astronomical signals. Statistical properties of quadratic norms (chi2) will be discussed in the context of signal detection and estimation of their parameters. Next comes general characteristics of time series and their pre-processing, analysis in the frequency domain analysis: evaluation of detection and estimation of signal parameters, probabilistic effects of correlation (red noise), bandwidth and empirical distributions, and when feasible, Monte Carlo simulations. A section on performance criteria and comparison of efficiency of different methods constitutes my own contribution to the field. Time permitting, I may add brief intro on suitable organization of data.

Lectures will take place weekly on Tuesdays at 11:00 am, starting from February 27, 2018 (Note change of day and hour ***) in NCAC smaller lecture room. There shall be no lectures at Easter and May 1st weeks. The lecture will consist of two parts running in parallel: introduction to statistics of TSA and weekly assignments to get hands on experience in application of provided Python algorithms on own data. Pre -requisites are access to python(python3 preferred) packages numpy, scipy, matplotlib and jupyter notebooks, though no prior knowledge of them is required. From computer lab I got info that needed software becomes installed in linux after execution of a bash|tcsh command line >source /Vol/share/anaconda/anaconda. Pls check that all works as expected.