

Test autocorrelation in irregularly(unevenly) spaced time series

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I have a dataset that includes observations at different time points. There are multiple observations at the same time points and the time points are not evenly spaced.

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Now, I would like to test whether the data are random or autocorrelated in time. Can I call such a dataset as a time series? If so, what kind test methods I can try to use for such an irregularly spaced time series?



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time-series

hypothesis-testing

autocorrelation

unevenly-spaced-time-series

edited Mar 8 at 10:46



kjetil b halvorsen

36.4k 9 90 283

asked Nov 21 '14 at 0:02



elly

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1 Answer



While it's apparently some form of time series, if there are multiple observations at a single point, it might be a little unusual to call it a time series.

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One difficulty I see is how do I relate (say) 2 observations at time τ to 3 observations at time $\tau - s$? What's the model? Does the expectation at time τ relate to the average at time $\tau - s$ or what?

With single-observation-at-a-time, there's certainly ways to write continuous-time autocorrelated models.

A common example is the [Ornstein-Uhlenbeck process](#). See also the [Vasicek model](#), a particular example of its use.

It's possible to write an unevenly-sampled observational model based on the O-U process as something of the form (if s, t are consecutive observation times):

$$(y_t - \mu) = \phi^{t-s}(y_s - \mu) + n_{t-s}, \quad \text{where } n_u \sim N(0, \frac{\sigma^2}{2\phi}(1 - e^{-2\phi u}))$$

(I think!), which when $t - s = 1$ (i.e. the usual regular-time interval situation) corresponds to an AR(1).

answered Nov 21 '14 at 3:45



Glen_b ♦

222k 23 438 795