160 Huntingdon Road

Dec 5 [illegible]

Dear Fisher,

When a series of observations (ordered with respect to time) have been used to fit functions by least squares we often want a rough test of independence of the errors. A general treatment would be a matter of serial correlation with complications. But if a set of errors are truly random, persistences & changes of sign are equally likely, and we can get a rough test by comparing their actual numbers with an even chance. If however one of the functions fitted ($y = \Sigma\, a_r f_r(t)$ with the a_r adjustable) is a constant we automatically introduce one change of sign at least by the fitting. Is there any general rule for the effect of fitting a's for a lot of different f_r at once?

I have a paper by a man who has fitted a lot of meridian places of Eros over 20 years or so & re-estimated orbital elements & masses of the inner planets from them. He has fitted 16 parameters; his residuals in right ascension show 17 persistences & 17 changes of sign, in declination 19 persistences & 17 changes. I think that with the number of parameters fitted there ought to be a decided excess of changes if the errors were random.

Do you know anything to the point?

Yours sincerely

Harold Jeffreys

6 K. Dec. P.C. sent acknowledging [illegible]

Copy.

Dear Fisher,

When a series of observations (ordered with respect to time,) have been used to fit a function by least squares we often want a rough test of independence of the errors. A general treatment would be a matter of serial correlation with complications. But if a set of errors are truly random, persistences and changes of sign are equally likely, and we can get a rough test by comparing their actual numbers with an even chance.

If however, one of the functions fitted ($y = \Sigma \alpha_m f_m(t)$ with α_m adjustable) is a constant, we automatically introduce one change of sign at least by the fitting. Is there any general rule for the effect of fitting α's for a lot of different f_m at once?

I have a paper by a man who has fitted a lot of mean places of Eros over 20 years or so and reestimated orbital elements and masses of the inner planets from them. He has fitted 16 parameters; his residuals in right ascension show 17 persistences and 17 changes of sign, in declination 19 persistences and 17 changes. I think that with the number of parameters fitted there ought to be a decided excess of changes if the errors were random.

Do you know anything to the point?

Yours sincerely,

sgnd. Harold Jeffreys.