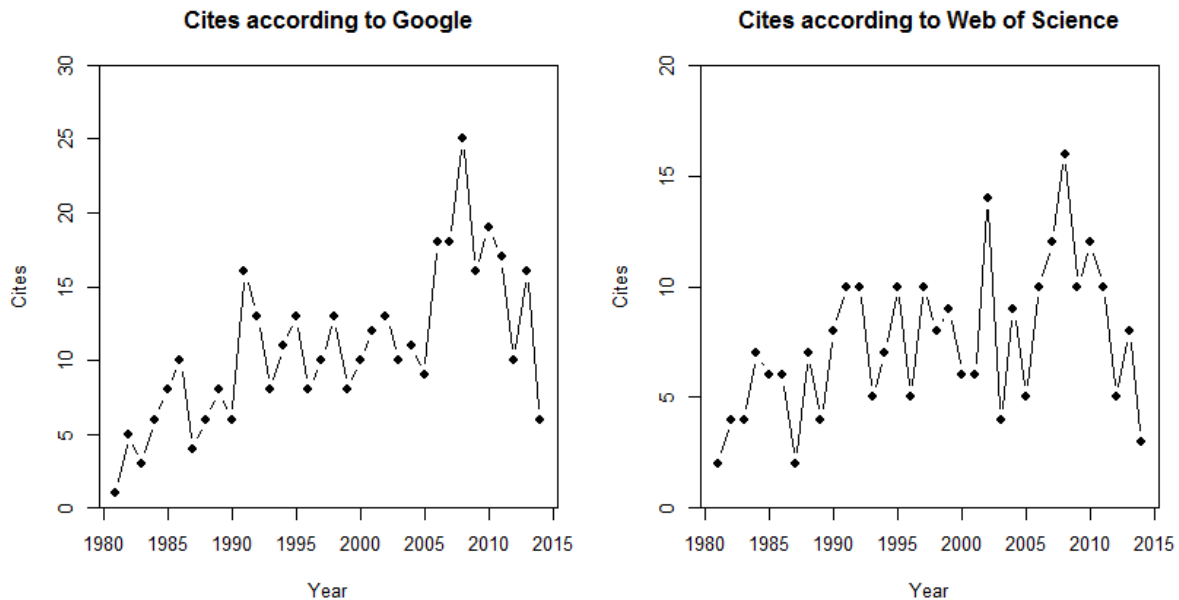


FISH 559: Example Application III (Modelling Citation Analysis)

The paper “Population dynamics of fox rabies in Europe” by Anderson et al. (Nature: 1981: 289: 765-771) developed a mathematical model for the dynamics of the interaction between fox populations and rabies. The authors note *iter alia* that there is a 3 to 5 year cycle in fox populations infected with rabies. A plot of the citations per year for this paper (see below) is suggestive of a 3 to 5 year cycle in citations (with an increasing trend)¹.



The objective of this assignment is to use TMB to fit a model in which citations according to Google exhibit a trend (linear or exponential) with a cyclic component (modelled as sine wave). You can assume that citations are Poisson-distributed. Compare your best-fit model with a model in which the cycle has a 4-year-period, using AICc. Also, plot the fits.

The pattern is more apparent if citations are extracted from Google – see how well your model performs when the cites are based of Web of Science.

What did you learn about using TMB in this case?

¹ This is pretty scary, lets be honest! Mind you it is not first time seemingly unrelated things are coincident: <http://www.school-for-champions.com/history/lincolnjfk.htm#.U5kVrPldXAs>