

## Re: Request for feedback on statistical method

**Source:** <http://sci.tech-archive.net/Archive/sci.stat.math/2004-11/0066.html>

---

**From:** Shepherd Moon (*shepherdmoon\_at\_yahoo.com*)

**Date:** 11/04/04

Date: 4 Nov 2004 12:03:22 -0800

Thanks to you as well for your reply. As I mentioned, I'll report back with anything I find out in the sci.physics post that may bear on the statistics.

Regards,  
Shepherdmoon

Einar Andreas Rødland <e.a.rodland@labmed.uio.no> wrote in message news:<41890181.4020702@labmed.uio.no>...

> *Shepherd Moon wrote:*

> > *There is one article that claims to have analyzed this claim*  
> > *statistically and claims that there is a "95% confidence level" that*  
> > *the speed of light has actually been decreasing over time. I'm trying*  
> > *to find out if this trend is real or artifactual. I suspect it is*  
> > *artifactual but am not a statistics expert.*

>

> *Ross Clement has already made some good points. There are more, though.*

>

> *As methods and technology has improved, we have been able to make more*  
> *and more accurate measurements. Thus, more recent measurements are*  
> *more accurate than the older ones. The statistical method used,*  
> *however, assumes (as far as I can see) that the estimation errors are*  
> *random and of constant magnitude, which is clearly not the case.*

>

> *Errors in physical experiment may be of several kinds: they may be*  
> *statistical errors (related to random measurement errors) or they may*  
> *be systematic errors (related to the method or experiment). The random*  
> *measurement errors may be assumed to be independent from experiment to*  
> *experiment, but systematic errors can not be expected to be*  
> *independent. E.g., some of the early methods used stellar aberration*  
> *<http://scienceworld.wolfram.com/physics/StellarAberration.html>*  
> *which depends on knowing the speed of the Earth around the Sun; if the*  
> *estimate of this speed is too high, it would consistently give too*  
> *high estimates of c no matter how accurate the measurements are; other*  
> *methods will have similar kinds of systematic errors. Thus another*  
> *basic assumption is unfounded...or at least lacking a proper motivation.*

>

> *If you take a look at the light speed estimates at different times,*

> *the difference from the presently known value is typically in the same*  
> *order as the stated uncertainty of the estimates. This is typical of*  
> *certain 'remarkable claims': they tend to be based on deviations that*  
> *are just about the same magnitude as the uncertainties...and these*  
> *deviations tend to decrease as the methods improve. The author,*  
> *however, seems to favour the explanation that the speed of light has*  
> *changed gradually until around 1960 when it converged very quickly*  
> *towards the value know today: it seems somewhat arbitrary for a*  
> *physical constant, after 6000 years of change, to suddenly stabilize*  
> *just as we start to measure it accurately.*

>  
> *Another thing is that today the speed of light is constant by*  
> *definition: it is the conversion factor between metres and seconds,*  
> *where one (don't remember which) is defined in terms of the other*  
> *given the defined value for c. The only fundamental dimensionless*  
> *constant is the fine structure constant:*  
> <http://scienceworld.wolfram.com/physics/FineStructureConstant.html>  
> *If this changes, it will not be possible (or meaningful?) to tell*  
> *which of the underlying physical constants have changed.*

>  
> *If the fine structure constant (or speed of light) had changed*  
> *dramatically in the last 6000 years, I'd think that should have given*  
> *very clear effects on the spectra of moderately distant stars...but*  
> *probably sci.physics would be the right place to ask about that. I*  
> *recall some time ago there was a report, from serious reasearchers,*  
> *indicating that it may have changed; but they were talking about the*  
> *early hours of the big bang, not the 'creation of the universe 6000*  
> *years ago'. I'm not certain what the final verdict was; but, again,*  
> *sci.physics should be the right place to ask.*

>  
> *The statistical article is here:*

>>  
>> *Is the Velocity of Light Constant in Time?*  
>> *by Alan Montgomery*  
>> *Mathematician*  
>> *218 McCurdy Drive, Kanata, Ontario K2L 2L6 Canada*  
>> *and*  
>> *Lambert Dolphin*  
>> *Physicist*  
>> *1103 Pomeroy Avenue, Santa Clara, CA 95051*  
>> <http://www.ldolphin.org/cdkgal.html>

>>  
>> *The original article is here:*  
>> *The Atomic Constants, Light, and Time*  
>> *by BARRY SETTERFIELD*  
>> *and*  
>> *TREVOR NORMAN*  
>> <http://www.setterfield.org/report/report.html>