Letters to the Editor

Objection to "Hoax" Accusation

I am writing to express my dismay at the use of the word *hoax* in Shlomo Sternberg's "Comments on the *Bible Code*" in the September 1997 *Notices*. According to my dictionary a hoax is a type of deception and to deceive is to deliberately mislead. One could argue that accusations of hoax never belong in the *Notices*, but even if one believes that such accusations may appear, one must demand they be accompanied by compelling evidence that the accused have indeed intended deliberate deception.

But in this case not a shred of evidence is provided that any deception was intended. Rather, Professor Sternberg gives us strong arguments that the accused (Professor Rips and Mr. Witztum) are wrong in their various publications on the subject. To be wrong is not to be guilty of perpetrating a hoax.

In connection with writing a piece for *Jewish Action* (the magazine of the OU, the largest Orthodox Jewish organization in the United States) entitled "A Skeptical Look at the Codes", I have looked at the *Statistical Science* article and many commentaries on the subject and had discussions with Professor Rips and some of the authors of the code-debunking papers. I share Professor Sternberg's opinion as to the correctness of the arguments of Professor Rips and Mr. Witztum, but I have not seen any convincing evidence of deliberate doctoring.

I might add that having had the pleasure of spending time with Professor Rips, I was struck by his gentleness and decency, and I find it impossible to conceive of his presenting any ideas that he doesn't believe in himself.

An accusation this serious without any proof is irresponsible. I believe both Professor Sternberg and the *Notices* owe Professor Rips and Mr. Witztum an apology.

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In Praise of Epsilon/Delta

The epsilon-delta definition of the limit is one of the greatest achievements of the human mind. It provides the answers to ancient paradoxes involving infinity, it allows us to discover which analytical ideas are true and which are false, and it gives us reliable methods of knowing what control over an input will produce the desired accuracy in the output.

The Greek letters epsilon and delta are better than the Latin letters e and d because (1) e and d are busy representing other things and (2) epsilon and delta have entered our common language. "We are within epsilon of solving the problem." "Houston, what's our delta v?" (In the latter example, the delta is a capital delta, but lowercase delta is just an upper bound on capital delta.)

Like the Hollywood screenwriters who attempt to rewrite *Hamlet* (to make it easier), all attempts I have seen to rewrite the epsilon-delta definition of the limit make things more confusing. "We get really, really, really very, very close." The original is crystal clear and in plain language says exactly this: A function has a limit at an input number x if and only if for any positive epsilon there is a delta that allows us to control the output of the function. Keeping the input within delta of x but not allowing the input to equal x forces the output to be within epsilon of the limit.

Students easily understand why it is a good thing to control output. A few examples show them why we sometimes want to avoid inputting x itself. A function is continuous at exactly those inputs where inputting x gives us the limit.

Most of the trouble my students have with epsilon-delta does not arise from not understanding what epsilon and delta are. They even appreciate the mathematical shorthand. The biggest problem they have is that they don't really understand subtraction and have never been told what the absolute value function is good for. Once they understand that a distance is the absolute value of a difference (highway mileage signs are a good way to make that clear), epsilon-delta is smooth sailing.

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About the Cover

The figure shows a simulation of a three-species competition system with a cyclic relationship: $1 > 2$, $2 > 3$, and $3 > 1$ where $>$ is short for outcompetes. The underlying model takes place on a 300 x 300 grid with each site being in state 1, 2, or 3. In the image the height represents the density of type 1 and the color the density of type 2 in an 11 x 11 window centered at the point. The initial state of the simulation consisted of three sectors, each occupied by one of the types. This spiral wave forms in the early stages of convergence to a spatially structured equilibrium state.

A report on this joint research of Richard Durrett, a Cornell mathematician, and Simon Levin, a Princeton mathematical biologist, can be found in *J. Theor. Biol.* **185** (1997), 165–171, or at `http://math.cornell.edu/~durrett/`. Linda Buttel performed the simulations on the Cornell supercomputer. The visualization using Data Explorer was done by Catherine Devine, a former employee of the now defunct Cornell National Supercomputer Facility.