MATHEMATICS' FEYNMAN STATEMENT: THINK GLOBALLY, ACT LOCALLY

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Abstract

In the first of his famous lectures on physics, Richard Feynman stated

> If, in some cataclysm, all of scientific knowledge were to be destroyed, and only one sentence passed on to the next generations of creatures, what statement would contain the most information in the fewest words? I believe it is the *atomic hypothesis* (or the atomic *fact*, or whatever you wish to call it) that *all things are made of atoms – little particles that move around in perpetual motion, attracting each other when they are a little distance apart, but repelling upon being squeezed into one another. . .*

What would a similar statement be for mathematics?

In this expository lecture, I propose that it is a local-global principle:

> "local" information about mathematical objects can be pieced together to determine "global" information about them

and provide a survey of examples demonstrating this principle.

While the majority of examples will come from my own field, number theory, examples from other areas of mathematics will also be given. This lecture is aimed at a general mathematical audience and all are welcome.