

The Unreasonable Effectiveness of Mathematics in Geophysics

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Abstract

The title is taken from a paper published by Eugene Wigner in 1960, “The Unreasonable Effectiveness of Mathematics in the Natural Sciences”. Wigner explored examples from Quantum Mechanics and General Relativity, two apparently very different subjects. In the present paper I explore several subjects in Geophysics, drawing on the published works of Tony Dahlen. These include papers on critical-taper wedge mechanics and mountain building, free oscillations of the earth, surface wave seismology, 3-D banana-doughnut travel-time tomography, and a few odds and ends. I speculate that mathematics is so unreasonably effective because we are so ignorant about how the world really works.