

MAY 27 2021: ZULF PROPOSES ENTIRELY NEW FOUNDATIONS OF SCIENTIFIC INFERENCE

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1. BACKGROUND

Years ago when I was a wee pup, I was taking a functional analysis course at Princeton taught by the great mathematician Peter Sarnak. I was young, and would follow along as best I could. He spoke about the beautiful solution of Riemann for the Dirichlet problem. The problem is $\Omega \subset \mathbf{R}^2$ is a smoothly bounded simply connected domain. We want to find a harmonic function with prescribed boundary values. Riemann's solution was

$$u_0 = \operatorname{argmin}_{u \in C^2} \int_{\Omega} |\nabla u|^2 dx$$

Karl Weierstrass hated it because he was not convinced that a minimizer will necessarily exist. And thus began the rigorous development of all of mathematics.

I feel that I am being the Karl Weierstrass in the situation, which is not really my cup of tea. I always admired Bernhard Riemann a great deal more than Karl Weierstrass.

I am not being Weierstrass. I am not suggesting that Statistical Inference is lacking a *mathematical* foundation. It has many. It is not for lack of formalisation that there is a serious problem today in Statistical Inference. Nay, it is that we have a more substantial problem of not being clear at all of what *Nature* is actually.