'A little learning is a dangerous thing!' (Alexander Pope, 1688-1744)

I have written about the problems posed by the different cultures to be found in the turbulence community; and in particular of the difficulties faced by some referees when confronted by Fourier methods. My interest in the matter is of course the difficulties faced by the author who dares to use Fourier transforms when he encounters such an individual. In my post on 20 April 2020, I told of the referee who described Fourier analysis as '*the usual wavenumber murder*'. Thinking of this brought back a rather strange incident from the mid-1970s, and it occurs to me that it really underlines my point.

In those days, we used to get visitors from the United States, who would come for a day and ask various people about their work. I seem to recall that they were sponsored by the Office for Naval Research and, as we benefited from a huge flow of NASA reports, stemming from their various programmes, it seemed only fair to send something back.

One particular visitor was a fluid dynamicist who worked on the lubrication of journal bearings. He was known to my colleagues in this area, who told me that he was eminent in that field. So, once he was settled in my office and we had got over the usual preliminaries, he asked me to explain my theoretical research to him. I went to the blackboard and happily began explaining about eliminating the pressure from the Navier-Stokes equation and then how to Fourier transform it.

I hadn't got very far, when he held up his hand and said. 'Stop right there! I wouldn't use Fourier transforms with a nonlinear problem like turbulence.'

I was a little bit taken aback, but my main reaction was that this was a chance for me to learn something, because it was at that time that I was receiving reports from JFM referees which were hostile to the use of Fourier methods.
I didn't waste time in asking him why. I just asked what he would use instead. His reply astonished me. 'I would use the Green's function method.'

In the circumstances I saw no point in continuing and changed the topic to talk about my other work. He seemed quite happy about that. Perhaps it was just a cunning plan to avoid listening to some boring mathematics for an hour or so?
At this stage it will be clear to many people why I did not continue the discussion. But for those who don't know, there were two points:
A. My visitor was wrong at the most fundamental level. Green's functions are only applicable to linear problems. For instance, we can eliminate the pressure field from the NSE, because it satisfies a Poisson's equation, which is of course linear.
B. As a sort of corollary of awfulness, a standard method of evaluating Green's functions is by the use of Fourier transforms!
These matters are discussed in detail in Appendix D of reference [1] below.

The title of the poem by Alexander Pope has passed into the language as a caution against being too authoritative when one is not really an expert. The question of who does more harm, someone who thinks he knows all about Fourier methods; or someone who is frightened of them and behaves in a childish way, is really a moot point.

[1] W. D. McComb. The Physics of Fluid Turbulence. Oxford

University Press,
1990.