CMS Krieger-Nelson Lecture
Conférence Krieger-Nelson de la SMC

BARBARA LEE KEYFITZ, Fields Institute and University of Houston

Conservation Laws: Past and Future

In this talk, I will give some history of the subject of hyperbolic conservation laws, and its role in the theory of partial differential equations and applied analysis. Of course, I will also try to describe current research and to predict future directions.

The title is also a play on words, as the theory of hyperbolic partial differential equations is bound up with the concept of time. But while many of the most frequently encountered linear hyperbolic equations, such as the wave equation, are well-posed in both forward and backward time directions, a salient feature of nonlinear hyperbolic conservation laws is that one must break the forward-backward time symmetry to establish a class of functions in which the equation is well-posed. This task is often described as "bringing in more physics", even though it can be described in purely mathematical terms. I will describe some ways in which it has been accomplished.