

## **Knowing your Limits**

**Joseph Rosenblatt**

**National Science Foundation**

**University of Illinois at Urbana-Champaign**

### **Abstract**

The convergence of time averages in dynamical systems is a subject with a long history in mathematics and in physics. It is still an active area of research in mathematics because of the connections that the subject has with areas such as harmonic analysis, probability theory, number theory, and combinatorics. Some of the past and ongoing work in this area will be described.

Then we will focus on the nature of the limit when the time averages converge at least in norm. We want to know when we are guaranteed that the integral, the classical space average in ergodic theory, is always the limit of our time averages. This issue turns out to be connected with problems in classical harmonic analysis such as the characterization of classes of measures in terms of which closed sets they annihilate.