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**Alexandre J. Chorin\*** ([chorin@math.berkeley.edu](mailto:chorin@math.berkeley.edu)), Dept. of Mathematics, University of California, Berkeley, Berkeley, CA 94720. *Commuting conditional expectations and nonlinear evolution.*

Let a vector  $u$  satisfy a (possibly stochastic) nonlinear equation  $du/dt=R(u)$ , and suppose you measure  $u$  at time  $t=0$ ; how do you estimate  $u$  at a later time  $t$ ? This question is answered by tools borrowed from the statistical mechanics of irreversible systems, which allow one to commute nonlinear evolution and conditional averaging.

The resulting construction makes it possible to estimate solutions of differential equations with partial or uncertain data, and to overcome some of technical difficulties in the statistical mechanics of partial differential equations. The applications include problems from hydrodynamics.

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