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Gisele Ruiz Goldstein* (ggoldste@memphis.edu), Department of Mathematical Sciences,
University of Memphis, Memphis, TN 38152. *Derivation and Applications of Dynamic Boundary
Conditions to Nonlinear Partial Differential Equations.*

We give a unified derivation of the heat equation and other equations with dynamic boundary conditions on a bounded region in R^n which are incorporated into the derivation of the equation. For the heat equation we consider dynamic boundary conditions which incorporate motion along the boundary as well as nonlinear effects.

We obtain well-posedness and regularity results. Our regularity results are analogous to those of H. Brezis and L.C. Evans (who worked in the case of nonlinear but nondynamic boundary conditions) and correspond to the optimal results suggested by the linear hypercontractivity estimates. Finally we present new results in which dynamic boundary conditions play a fundamental role in obtaining significant extensions of the classical results of Landisman and Lazar.

The works to be discussed are partially in collaboration with Angelo Favini (Universit di Bologna), Ciprian Gal (Morgan State University), Jerry Goldstein (Univeristy of Memphis), and Silvia Romanelli (Universit di Bari). (Received September 27, 2006)