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Susan Hammond Marshall* (smarshal@monmouth.edu), Monmouth University, and **Donald R. Smith** (dsmith@monmouth.edu), Monmouth University. *Feedback, Control and the Distribution of Prime Numbers.*

Feedback and control systems model complicated phenomena and help explain, for example, why a driven car stays on the road. Mathematically, these systems are modeled by differential equations whose solutions result in either explosive or damped behavior combined with either oscillatory or non-oscillatory behavior. We explain the intuitive feedback inherent in prime number distribution - that “too many” primes “knock out” potential future primes - and model this feedback as a differential equation. The solution to this differential equation intuitively explains why the density of primes “stays on the road” with a density of $1/\ln(x)$, the celebrated Prime Number Theorem, and why the total number of primes crosses its approximation infinitely many times. This talk should be widely accessible (in fact, to an advanced undergraduate audience) and combines ideas from mathematical modeling, prime number theory and differential equations. (Received September 19, 2007)