Keyfitz and Kranzer introduced the notion of *singular shock waves* for systems of conservation laws $u_t + f(u)_x = 0$. Roughly speaking, a shock wave is a Heaviside function, whereas a singular shock wave is a Heaviside function plus a δ-function concentrated at the discontinuity. There are systems of conservation laws for which Riemann problems do not always have a solution consisting of combinations of rarefactions and shock waves, but do always have a unique solution when singular shocks are allowed. Keyfitz and Kranzer conjectured that singular shocks could be approximated, for small $\epsilon > 0$, by self-similar solutions $u(\frac{t}{\epsilon})$ of the system’s Dafermos regularization $u_t + f(u)_x = \epsilon u_{xx}$. The self-similar solutions should grow arbitrarily large near the discontinuity as $\epsilon \to 0$. For a model problem, we show that this conjecture is correct. The proof avoids the problem of matching difficult asymptotic expansions by using geometric singular perturbation theory. More precisely, we use the blowing-up approach to geometric singular perturbation problems that lack normal hyperbolicity, together with a new “Corner Lemma” that should be useful in other problems.

**Graduate students are invited to attend.**

For questions, comments, and offers to talk, contact Steve Schecter, schecter@math.ncsu.edu. Please visit the DE Seminar web page at www.math.ncsu.edu/seminars.html.