Meeting: 1001, Evanston, Illinois, SS 14A, Special Session on Nonlinear Waves

1001-35-261 **Jerry Bona**, University of Illinois at Chicago, USA, **Thanasis Fokas**, University of Cambridge, UK, and **Laihan Luo*** (robert.luo@stockton.edu), Professional Studies, Richard Stockton College of New Jersey, USA, Pomona, NJ 08240. *Decay of Solutions for Some Nonlinear Partial Differential Equations.* Preliminary report.

What is the decay rate of solutions of the initial-value problems of the heat equation

$$u_t - \nu u_{xx} = 0? \qquad (*)$$

Someone might simply say that the decay rate of solutions for the heat equation (*) is $\frac{1}{2}$ because the representation of solutions has a factor $t^{-\frac{1}{2}}$. However, the decay rate of the corresponding solutions of the heat equation (*) would be greater than $\frac{1}{2}$ for some initial data.

For large p, would the decay rate of the solutions of the initial-value problems of the generalized Burgers equation

$$u_t + u^p u_x - \nu u_{xx} = 0,$$

be the same as the decay rate of the solutions of the heat equation (*)? In some cases the decay rate of the two equations will be different.

The authors will answer the questions mentioned above and explain the detailed reasons by applying modern information technology — **mathematical theorem in a visual form.** It will be **"seen"** why some researchers have made wrong conclusions, what have been corrected, and how more difficult theorems to some nonlinear dispersive wave equations with dissipation have been proved (the particular examples of these equations are the generalized Korteweg-de Vries-Burgers equation and the generalized Benjamin-Ono-Burgers equation). (Received August 28, 2004)