

On the Camassa-Holm equation

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Abstract:

This talk is focused on recent progress of studies for the Camassa-Holm equation. First, we will give a brief review on the derivations, well-posedness for the strong solution, blow-up phenomenon and existence of the weak solutions. Then, infinite propagation speed for the Camassa-Holm equation will be proved in the following sense: the corresponding solution $u(x, t)$ with compactly supported initial datum $u_0(x)$ does *not* has compact x -support any longer in its lifespan. Moreover, we show that for any fixed time $t > 0$ in its lifespan, the corresponding solution $u(x, t)$ behaves as: $u(x, t) = L(t)e^{-x}$ for $x \gg 1$, and $u(x, t) = l(t)e^x$ for $x \ll -1$, with a strictly increasing function $L(t) > 0$ and a strictly decreasing function $l(t) < 0$ respectively. Finally, some interesting open problems will be listed.

References:

1. A. Himonas, G. Misiolek, G. Ponce and Y. Zhou, Comm. Math. Phys. 271, 511-522 (2007).