

Abstrat

We analyze a singularly Kuramoto-Sivashinsky perturbed Camassa-Holm equation with methods of the geometric singular perturbation theory. Especially, we study the persistence of smooth and peaked solitons. Whether a solitary wave of the original Camassa-Holm equation is smooth or peaked depends on whether the parameter $2k$ is equal to 0, which is related to the critical wave speed. On the one hand, we prove that if $2k > 0$, then a unique solitary wave persists under singular Kuramoto-Sivashinsky perturbation. On the other hand, we show that if $2k = 0$, then any observable soliton fails to persist.