

STABILITY ANALYSIS FOR THE SCALAR VISCOUS CONSERVATION LAW WITH TIME DELAY

ABSTRACT. In this talk, we consider the stability of the non-zero equilibrium state for the scalar viscous conservation law with a delay effect. The linear stability is analyzed by using the characteristic equation of the corresponding eigenvalue problem. If our equation does not have a delay effect, the characteristic equation is given by a polynomial equation. On the other hand, if our equation has a delay effect, the characteristic equation becomes a transcendental equation, and it is not easy to analyze it. In this situation, we apply the useful known result concerned with the characteristic equation for the ordinary delay differential equations and try to get the sharp stability condition for our equation. In addition, the nonlinear stability will be studied in the second half of the talk. Furthermore, if there is time remaining, we will discuss the stability of nonlinear waves.

Authors.

- (1) YOSHIHIRO UEDA. *Kobe University, Japan.*

E-mail: ueda@maritime.kobe-u.ac.jp

References.

- (1) Ueda, Yoshihiro.; *Linear stability of the non-zero equilibrium state for the viscous Burgers equation with time delay*, Japan Journal of Industrial and Applied Mathematics, 42(5),2025, 2057-2072.
- (2) Ueda, Yoshihiro.; *Nonlinear stability of equilibrium states for the viscous conservation laws with time delay*, Mathematische Annalen, 395(2),2026, Paper No.45, 31pp.