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DK Seminar

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Classification of the dissipative structure for the hyperbolic system with relaxation

In this talk, we consider the Cauchy problem for the first-order linear symmetric hyperbolic system of equations with relaxation. When the degenerate relaxation matrix is symmetric, Umeda-Kawashima-Shizuta proved the large-time asymptotic stability. The key idea that first introduced the so-called Kawashima-Shizuta condition is to design the compensating matrix to capture the dissipation of systems over the degenerate kernel space of the relaxation matrix. Unfortunately, when the degenerate relaxation matrix is not symmetric, that results can not be applied any longer. In fact, this is the case for some concrete systems, for example, the Timoshenko system and the Euler-Maxwell system, where the linearized relaxation matrix indeed has a nonzero skew-symmetric part while it was still proved that solutions decay in time in some different way. Therefore, our purpose of this talk is to formulate some new structural conditions in order to extend the previous works to our general system when the relaxation matrix is not symmetric, which can include both the Timoshenko system and the Euler-Maxwell system. The results of this talk are based on a joint work with Shuichi Kawashima (Kyushu University).