

Chapter 3

Quasilinear strictly hyperbolic systems

In this chapter, we consider quasilinear strictly hyperbolic systems and study systematically classical solutions in the large to their Cauchy problems. Throughout this chapter, we always assume that system (1.1) is strictly hyperbolic in a neighbourhood of $u = 0$.

§3.1. Matching condition

Consider system (1.1) and assume that

$$\lambda_1(0) < \cdots < \lambda_n(0). \quad (3.1.1)$$

Definition 3.1. The i -th characteristic $\lambda_i(u)$ is *weakly linearly degenerate*, if, along the i -th characteristic trajectory $u = u^{(i)}(s)$ passing through $u = 0$, defined by

$$\begin{cases} \frac{du}{ds} = r_i(u), \\ s = 0 : \quad u = 0, \end{cases} \quad (3.1.2)$$