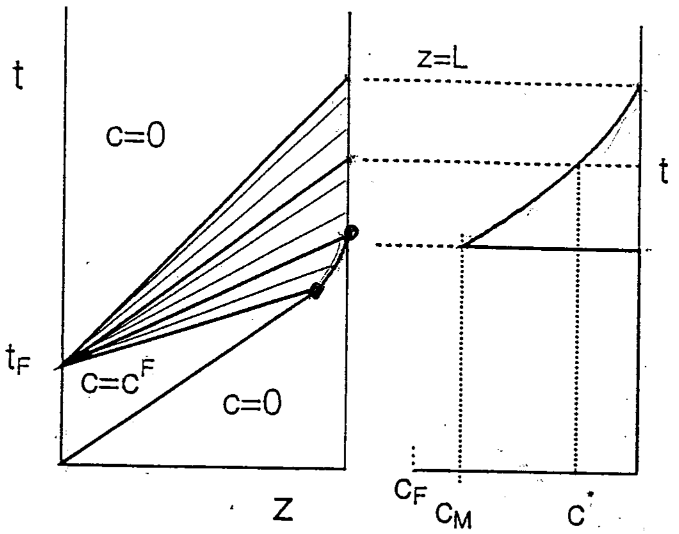
ET-10. Pulse Propagation
Shock/Wave Interference

- At very large pulse concentration



- All concentration states propagate and break through along their own characteristic emanating from point $(0, t_p)$:

$$t(c^*) = t_p + \sigma(c^*)L = t_p + \frac{L}{u}\left[\varepsilon + (1-\varepsilon)\left(\frac{dq}{dc}\right)_{c=c^*}\right]$$

- The area below the outcoming pulse must be equal to the amount injected:

$$\begin{aligned} M &= t_p u c^F = \int_{t_F}^{t_T} u c dt = \left\{ dt = (1-\varepsilon)\frac{L}{u}\frac{d^2q}{dc^2} \right\} = \\ &= (1-\varepsilon)L\int_{c_M}^{0} c\frac{d^2q}{dc^2}dc = \{\text{through integration by parts}\} = \\ &= (1-\varepsilon)L\left[c\frac{dq}{dc} - q\right]_{c_M}^{0} = (1-\varepsilon)L\left[-c_M\left(\frac{dq}{dc}\right)_{c_M} + q_M\right] \end{aligned}$$

This is an algebraic equation in the unknown concentration of the peak maximum c_M; from the knowledge of c_M the whole pulse profile can be calculated.