Piston Dispersive Shock Wave Problem

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two

$$i\varepsilon \;_t = -\frac{\varepsilon^2}{2} \quad + V_0(\;, t) \quad + | \quad |^2 \;, \qquad 0 < \varepsilon \ll 1. \qquad (\;)$$

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$\varepsilon = 0.015$

$V_0(\;, t) = V_{max} H(\; _p t -$

$)$ $H(\;)$

V_{max} p

$(\;, 0) \to \sqrt{\rho_R}$ $\to \infty$ $(\;, 0) \to$

0 $\to -\infty$

$V_{max} \gg \rho_R$

$V_{max} H(- \;)$

$t \leq 0$

$\rho_R = 0.133$

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$$= \sqrt{\rho}\exp[\tfrac{i}{\varepsilon}\int_0 \ (\ ', t)d\ ']$$

, ,

$$\rho_t + (\rho\ )\ = 0,$$

$$(\rho\ )_t + \left(\rho\ ^2 + \frac{1}{2}\rho^2\right) = \frac{\varepsilon^2}{4}[\rho(\log\rho)\ ]\ - \rho V_0\ , \qquad (\ )$$

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′ $\bar{s} = \frac{1}{2}$ $p + \sqrt{\rho_R}$, $\quad$ $\bar{s}^{+} = \frac{2\ \frac{2}{p} + 4\ p\sqrt{\rho_R} + \rho_R}{\ p + \sqrt{\rho_R}}$.

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$$\rho_{\min} = \left(\sqrt{\rho_R} - \frac{1}{2}\ p\right)^2, \qquad \min = -\ p\left(\frac{\sqrt{\rho_R} + \frac{1}{2}\ p}{\sqrt{\rho_R} - \frac{1}{2}\ p}\right).$$

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$\rho_{\max} = \rho_L = (\ p/2 + \sqrt{\rho_R})^2$ $\max = \ L = \ p$

E ( ) = V = p (, ,
,)
$l = 2\varepsilon K(4\rho_R/\ ^2_p)/\ _p$
(
, , σ) , s = p + (p + $3\sqrt{\rho_R}$)[$\frac{\ pE(4\rho_R/\ ^2_p)}{(\ p-2\sqrt{\rho_R})K(4\rho_R/\ ^2_p)} - 1$]$^{-1}$
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, , ,
$N_{\mathrm{vac}}(t) \approx \lceil \frac{\bar{s}-\ p}{l} t \rceil = \lceil \frac{(\ \bar{s}-\ p)\ p}{2\varepsilon K(4\rho_R/\ ^2_p)} t \rceil$
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s E ( ) , ,
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(p = $\sqrt{\rho_R}$) (p = 2.5$\sqrt{\rho_R}$)
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= p