

Appendix-D

Initial and Boundary Conditions

Table 1, summarizes all the initial and boundary conditions used in the solution

Table 1: *Initial and boundary conditions.*

	Region-1	Region-2	Region-3
Eqs.	$\bar{p}_{D1} _{y_D} = C_1 \cdot e^{\sqrt{m} \cdot y_D}$ $\left. \frac{d\bar{p}_{D1}}{dy_D} \right _{y_D=0} = C_1 \cdot \sqrt{m} \cdot e^{\sqrt{m} \cdot y_D}$ $(0 < y < -\infty)$	$\bar{p}_{D2} _{y_D} = C'_2 \cdot e^{+\sqrt{m} \cdot y_D} + C''_2 \cdot e^{-\sqrt{m} \cdot y_D}$ $\left. \frac{d\bar{p}_{D2}}{dy_D} \right _{y_D} = C'_2 \cdot \sqrt{m} \cdot e^{+\sqrt{m} \cdot y_D} - C''_2 \cdot \sqrt{m} \cdot e^{-\sqrt{m} \cdot y_D}$ $(0 < y < d_F)$	$\bar{p}_{D3} _{y_D=d_F} = C_3 \cdot e^{-\sqrt{m} \cdot (y_D-d_F)}$ $\left. \frac{d\bar{p}_{D3}}{dy_D} \right _{y_D=d_F} = -C_3 \cdot \sqrt{m} \cdot e^{-\sqrt{m} \cdot (y_D-d_F)}$ $(d_F < y < \infty)$
$Y_D = 0$	$\bar{p}_{D1} _{y_D=0} = C_1 = \bar{p}_{Df}$ $\left. \frac{d\bar{p}_{D1}}{dy_D} \right _{y_D=0} = C_1 \cdot \sqrt{m} = \bar{p}_{Df} \cdot \sqrt{m}$	$\bar{p}_{D2} _{y_D=0} = C'_2 + C''_2$ $\left. \frac{d\bar{p}_{D2}}{dy_D} \right _{y_D=0} = C'_2 \cdot \sqrt{m} - C''_2 \cdot \sqrt{m}$	Not Applicable
$Y_D = d_F$	Not Applicable	$\bar{p}_{D2} _{y_D=d_F} = C'_2 \cdot e^{+\sqrt{m} \cdot d_F} + C''_2 \cdot e^{-\sqrt{m} \cdot d_F}$ $\left. \frac{d\bar{p}_{D2}}{dy_D} \right _{y_D=d_F} = C'_2 \cdot \sqrt{m} \cdot e^{+\sqrt{m} \cdot d_F} - C''_2 \cdot \sqrt{m} \cdot e^{-\sqrt{m} \cdot d_F}$	$\bar{p}_{D3} _{y_D=d_F} = C_3 = \bar{p}_{DF}$ $\left. \frac{d\bar{p}_{D3}}{dy_D} \right _{y_D=d_F} = -C_3 \cdot \sqrt{m} = -\bar{p}_{DF} \cdot \sqrt{m}$
		$\bar{p}_{D1} = \bar{p}_{D2} = \bar{p}_{Df} = C_1$	
		$\bar{p}_{D2} = \bar{p}_{D3} = \bar{p}_{DF} = C_3$	
$t_D = 0$	$p_{(t,x,y)} _{t=0} = p_i$ $p_{D1} = p_{D2} = p_{D3} = p_{Df} = p_{DF} = 0,$ <p>since, $p_D = \frac{k_r h [p_i - p]}{141.2 q \beta \mu}$, and thus, $p_i - p = 0$</p> $p_1 = p_2 = p_3 = p_f = p_F = p_i$		