Final RHPZ lim $T \to 0$!

A

$$\frac{i_v(m_c+m_d)\, i(t-T) - i_v(m_c+m_d)\, i(t)}{T}$$

$$= -i_v(m_c+m_d)\,\frac{i(t)-i(t-T)}{T} + m_c^2\, i(t) + m_c m_d\, i(t-T)$$

lim $T \to 0$

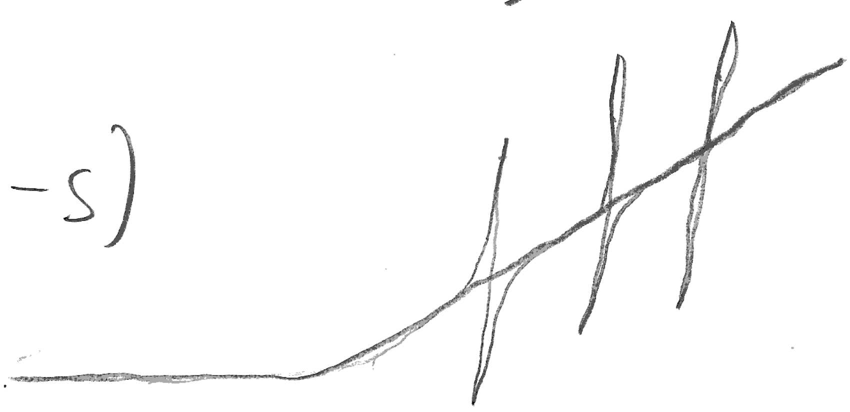
$$= (m_c^2 + m_c m_d)\, i(t) - i_v(m_c+m_d)\,\frac{d\, i(t)}{dt}$$

$$\frac{I_{dg}(s)}{I_v(s)} = m_c^2 + m_c m_d - i_v(m_c+m_d)\, s$$

$m_c(m_c+m_d)$

$$= g\; i_v(m_c+m_d)\left(\frac{m_c^2+m_c m_d}{i_v(m_c+m_d)} - s\right)$$

$$= g\; i_v(m_c+m_d)\left(\frac{m_c}{i_v} - s\right)$$



⑧

$$\frac{\frac{V_{cg}}{L}}{\left(\frac{1}{D'}\right) i_{dg} - \frac{T}{2L} V_{dg} D}$$

$$\frac{V_{cg}}{i_{dg}} \frac{D'}{L} = R \frac{D'}{L}$$

$\lim T \to 0$

$$g\, i_v (m_c + m_d) = i_v \frac{\cancel{m_c + m_d}}{(m_c + m_d)^{\cancel{2}}}$$

$$V_{cg} = \frac{V_{dg}}{D} - V_{dg}$$

$$= \frac{i_v}{m_c + m_d}$$

$$D = \frac{V_{dg}}{V_{dg} + V_{cg}}$$

$$V_{cg} + D V_{dg} = \frac{V_{dg}}{D}$$

$$\frac{2 \frac{V_{cg}}{V_{dg} D}}{\left(\frac{1}{D'}\right) \frac{2L}{V_{dg} D} i_{dg} - T} = \frac{V_{cg}}{\frac{1}{D'} i_{dg} L} = R \frac{D'}{L}$$

$\lim T \to 0$

$$\frac{(1-D)(1-D)}{D} = \frac{1-D+D+D^2}{D} \qquad \frac{D'^2}{D}$$

$$D'\left(\frac{1}{D} - 1\right)$$

$$\frac{1}{D} - \frac{2D}{D} + \frac{D^2}{D}$$

$$= \frac{1}{D} - 2 + D = \frac{1-2D+D^2}{D}$$

C

$$\frac{V_{dg}\left(\frac{1}{D}-1\right)}{\frac{1}{D'} i_{dg} L} = R$$

$$\frac{\left(\frac{1}{D}-1\right) D'}{L} = R \frac{\frac{D'}{D} - D'}{L}$$

$$= \frac{D' - D'D}{DL} R$$

$$\frac{D'(1-D)}{DL}$$

$$\boxed{\omega_{RHPZ} = \frac{D'^2}{LD} R}$$