

# Asymptotic Behavior of Growthrate for incompressible combined RT-KH instability at high difference in velocities

$$\gamma = \pm \frac{g * c_2}{2 * c_1 * d} - k * (U_1 + c_1) \cdot i$$

$$\gamma = \pm \frac{g}{2} * \left( \frac{1}{c_1} - \frac{1}{c_2} \right) - k * \left( \frac{c_1 * d}{c_1 + c_2} + U_1 \right) \cdot i$$

The first equation gives the growthrate for the least unstable mode, while the second gives it for the most unstable mode. The variables are as follows,  $\gamma$  is the growthrate,  $g$  is the gravitation force acting on the fluid,  $k$  is the x component of the wave vector,  $U_1$  is the velocity of the top fluid,  $d$  is defined as  $U_2 - U_1$  where  $U_2$  is the velocity of the bottom fluid,  $c_1$  is defined as  $\sqrt{\frac{P}{\rho_1}}$ , where  $P$  is the pressure at the interface and  $\rho_1$  is the density in the top fluid, and  $c_2$  is defined as  $\sqrt{\frac{P}{\rho_2}}$ , where  $\rho_2$  is the density in the bottom fluid.