$$\left[\frac{2(m+1)\tan\theta'}{Bg}\right]v_o^2+\left[\frac{1}{K_o}\left(1-\frac{\rho_{bo}}{\rho_{bmp}}\right)\right]v_o+\frac{2(m+1)\cos\theta'\sin(\beta+\theta')f_C}{\rho_b gB}-1=0$$