Interfacial cracking in a graded coating/substrate system loaded by a frictional sliding flat punch

- Electronic supplementary material - (Figure 7-13)

BY HYUNG JIP CHOI[1,*] AND GLAUCIO H. PAULINO[2]

[1]*School of Mechanical and Automotive Engineering, Kookmin University, Seoul 136-702, Republic of Korea* (hjchoi@kookmin.ac.kr)

[2]*Department of Civil and Environmental Engineering, University of Illinois at Urbana-Champaign, Urbana, IL 61801, USA* (paulino@uiuc.edu)

[*] Author for correspondence.

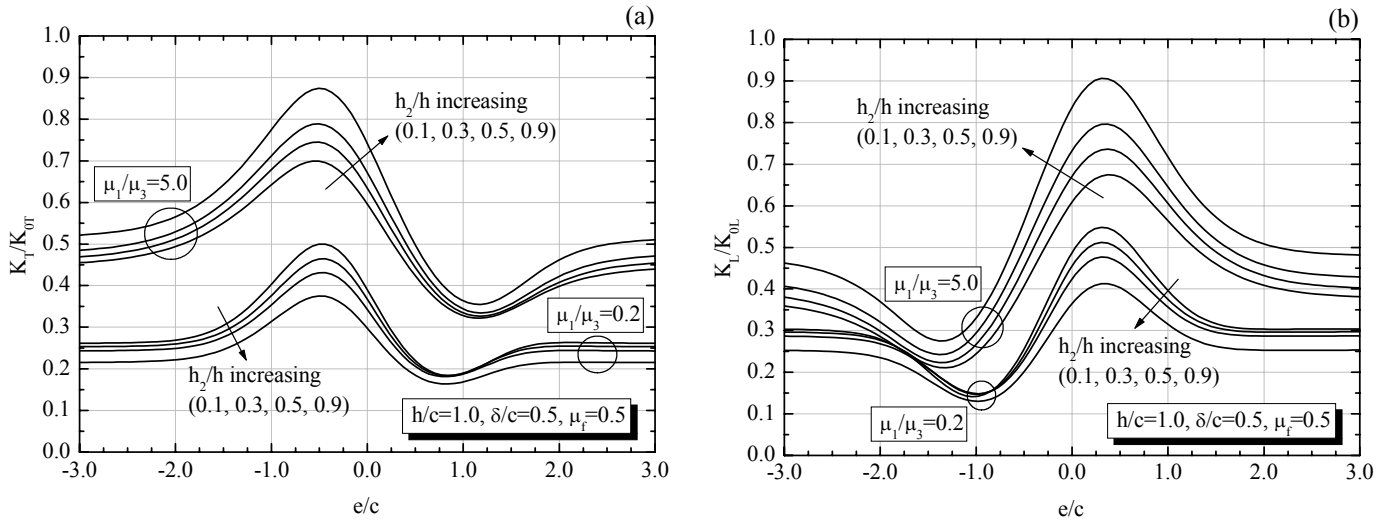

Figure 7. Variations of punch-edge stress intensity factors (a) K_T/K_{0T} and (b) K_L/K_{0L} versus punch location e/c for different values of interlayer thickness h_2/h and shear modulus ratio μ_1/μ_3 (h/c=1.0, δ/c=0.5, μ_f=0.5, $K_{0T}=\sigma_0(2\delta)^{-\omega}$, $K_{0L}=\sigma_0(2\delta)^{-\chi}$, $\sigma_0=P/2\delta$).

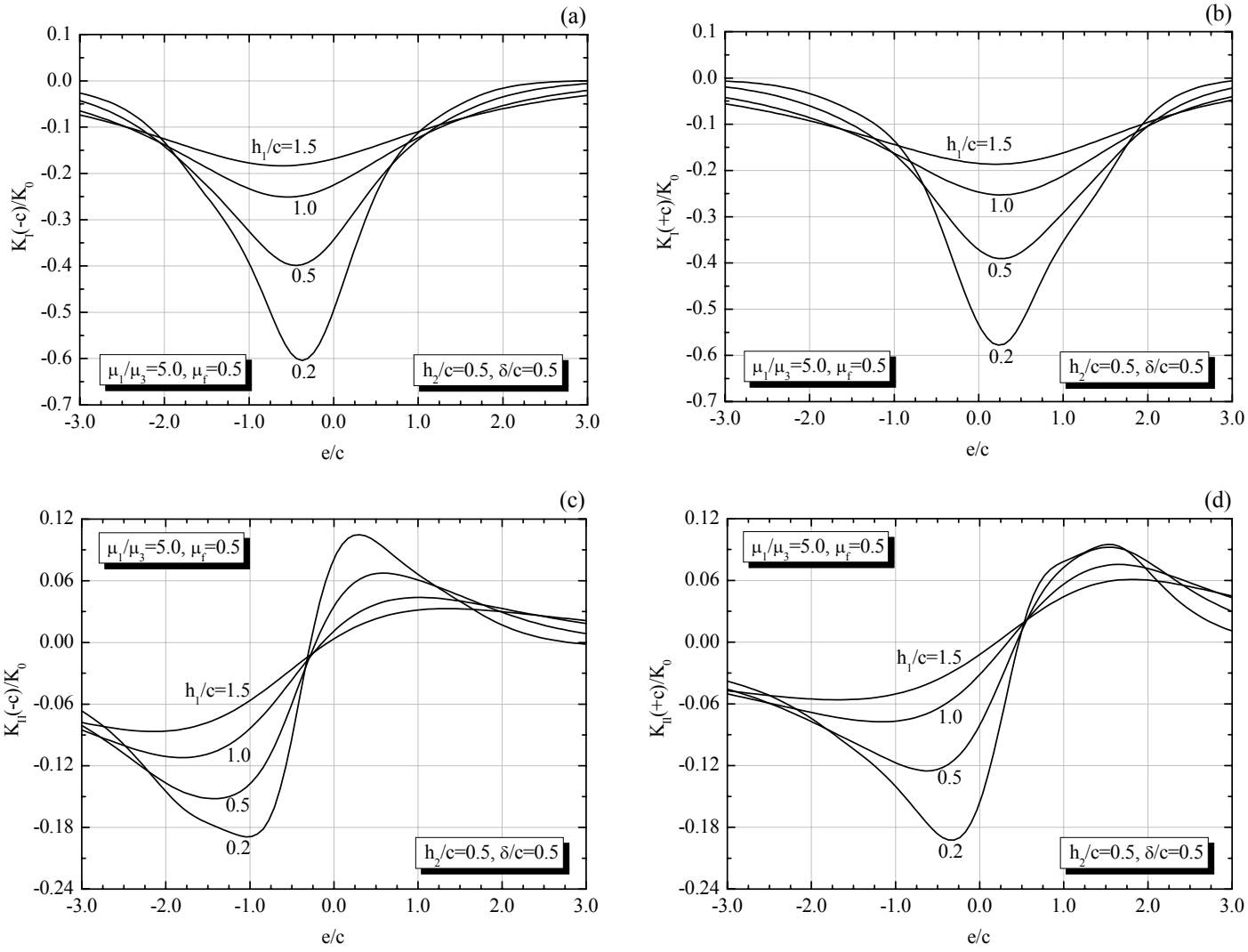

Figure 8. Variations of crack-tip stress intensity factors (a) $K_I(-c)/K_0$, (b) $K_I(+c)/K_0$, (c) $K_{II}(-c)/K_0$, and (d) $K_{II}(+c)/K_0$ versus punch location e/c for different values of coating thickness h_1/c (μ_1/μ_3=5.0, μ_f=0.5, h_2/c=0.5, δ/c=0.5, $K_0=\sigma_0 c^{1/2}$, $\sigma_0=P/2\delta$).

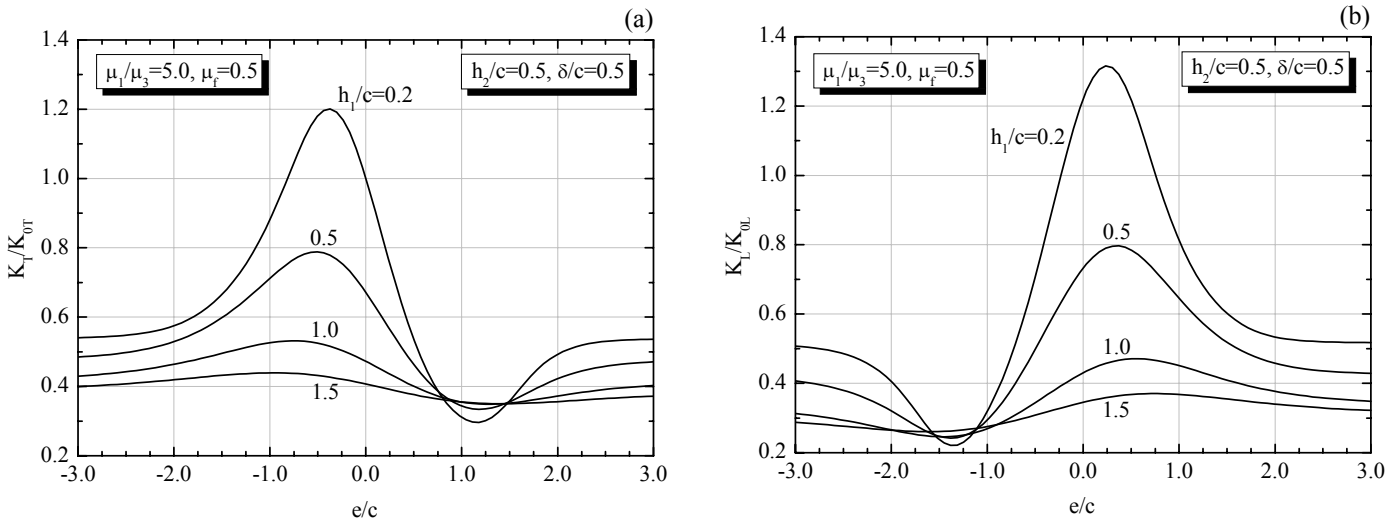

Figure 9. Variations of punch-edge stress intensity factors (a) K_T/K_{0T} and (b) K_L/K_{0L} versus punch location e/c for different values of coating thickness h_1/c (μ_1/μ_3=5.0, μ_f=0.5, h_2/c=0.5, δ/c=0.5, $K_{0T}=\sigma_0(2\delta)^{-\omega}$, $K_{0L}=\sigma_0(2\delta)^{-\chi}$, $\sigma_0=P/2\delta$).

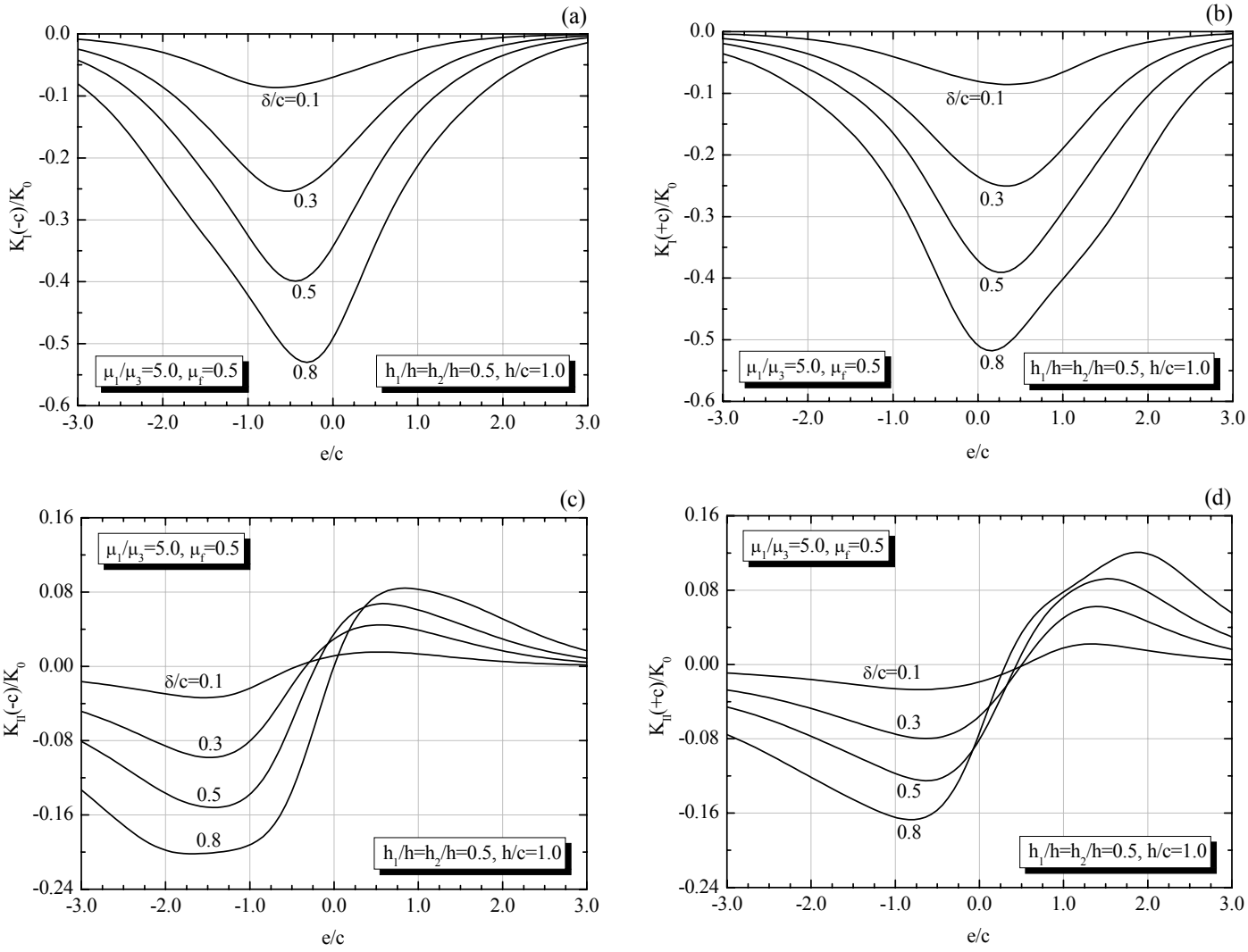

Figure 10. Variations of crack-tip stress intensity factors (a) $K_{\mathrm{I}}(-c)/K_0$, (b) $K_{\mathrm{I}}(+c)/K_0$, (c) $K_{\mathrm{II}}(-c)/K_0$, and (d) $K_{\mathrm{II}}(+c)/K_0$ versus punch location e/c for different values of punch width δ/c (μ_1/μ_3=5.0, μ_f=0.5, $h_1/h=h_2/h$=0.5, h/c=1.0, $K_0=\sigma_0 c^{1/2}$, $\sigma_0=P/2\delta$).

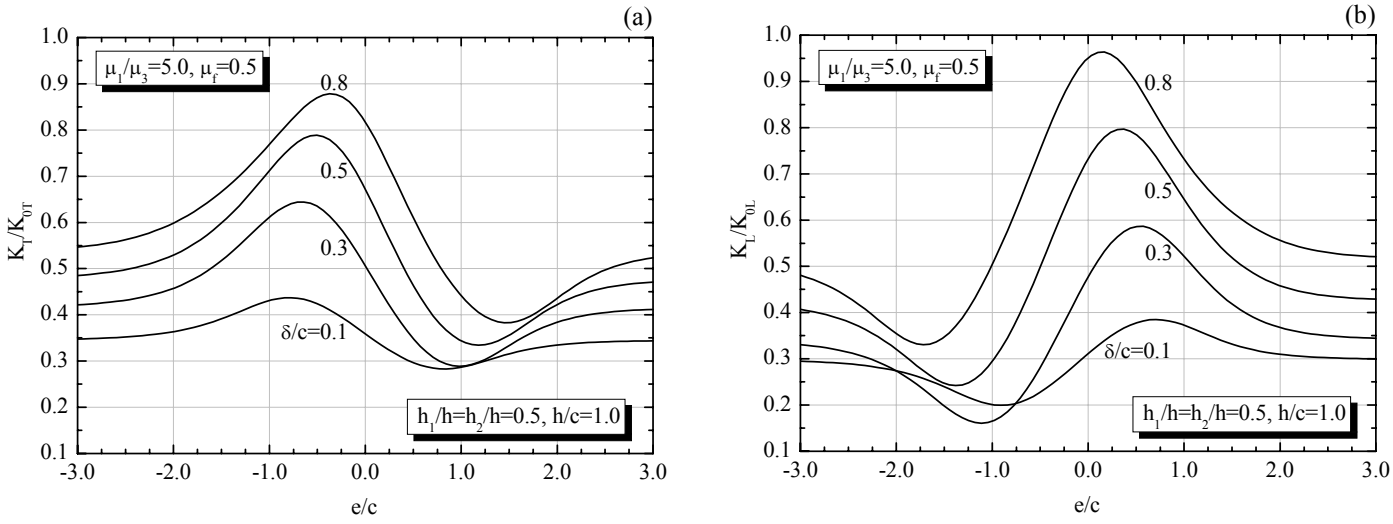

Figure 11. Variations of punch-edge stress intensity factors (a) K_T/K_{0T} and (b) K_L/K_{0L} versus punch location e/c for different values of punch width δ/c (μ_1/μ_3=5.0, μ_f=0.5, $h_1/h=h_2/h$=0.5, h/c=1.0, $K_{0T}=\sigma_0(2\delta)^{-\omega}$, $K_{0L}=\sigma_0(2\delta)^{-\chi}$, $\sigma_0=P/2\delta$).

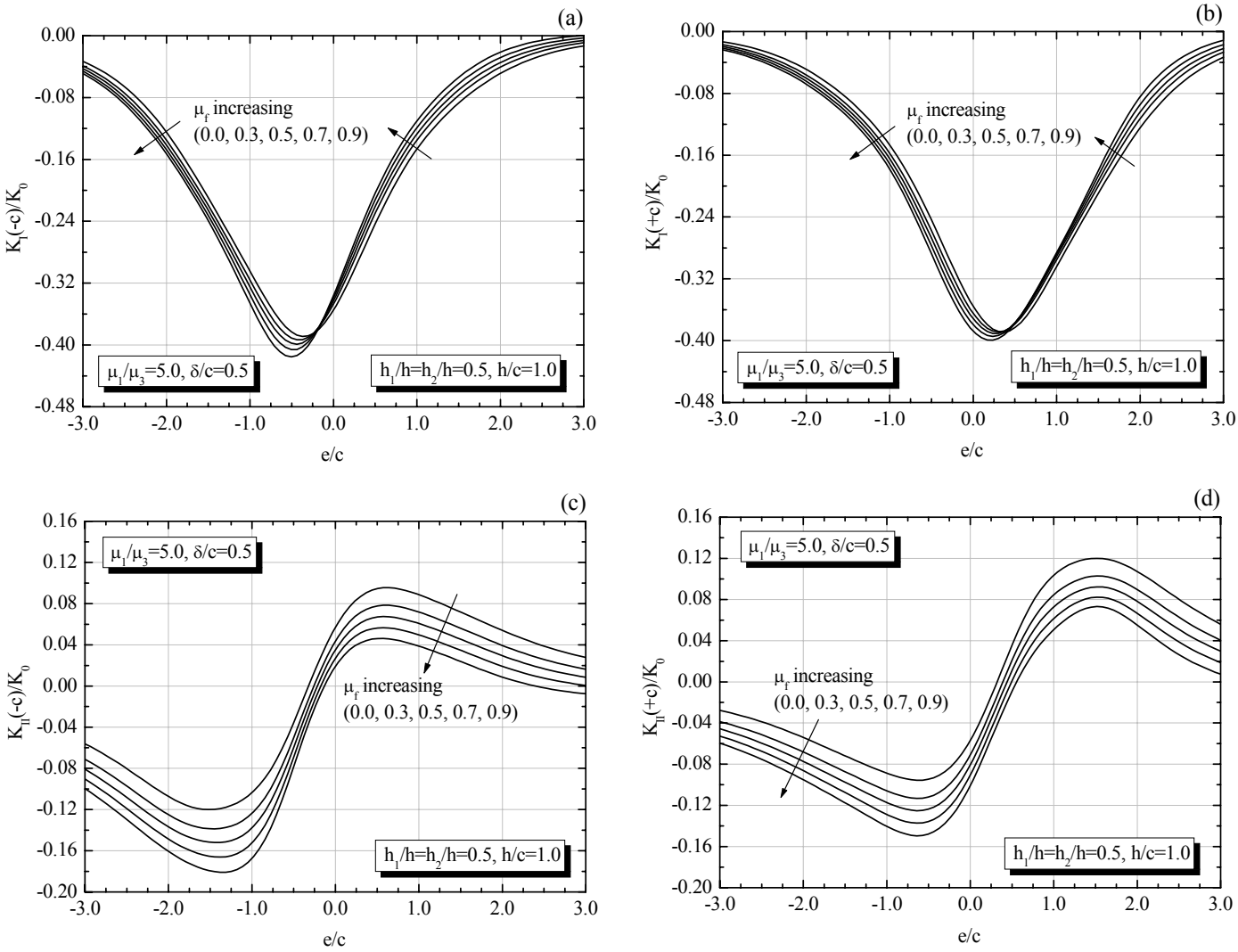

Figure 12. Variations of crack-tip stress intensity factors (a) $K_{\mathrm{I}}(-c)/K_0$, (b) $K_{\mathrm{I}}(+c)/K_0$, (c) $K_{\mathrm{II}}(-c)/K_0$, and (d) $K_{\mathrm{II}}(+c)/K_0$ versus punch location e/c for different values of friction coefficient μ_f (μ_1/μ_3=5.0, δ/c=0.5, h_1/h=h_2/h=0.5, h/c=1.0, K_0=$\sigma_0 c^{1/2}$, σ_0=$P/2\delta$).

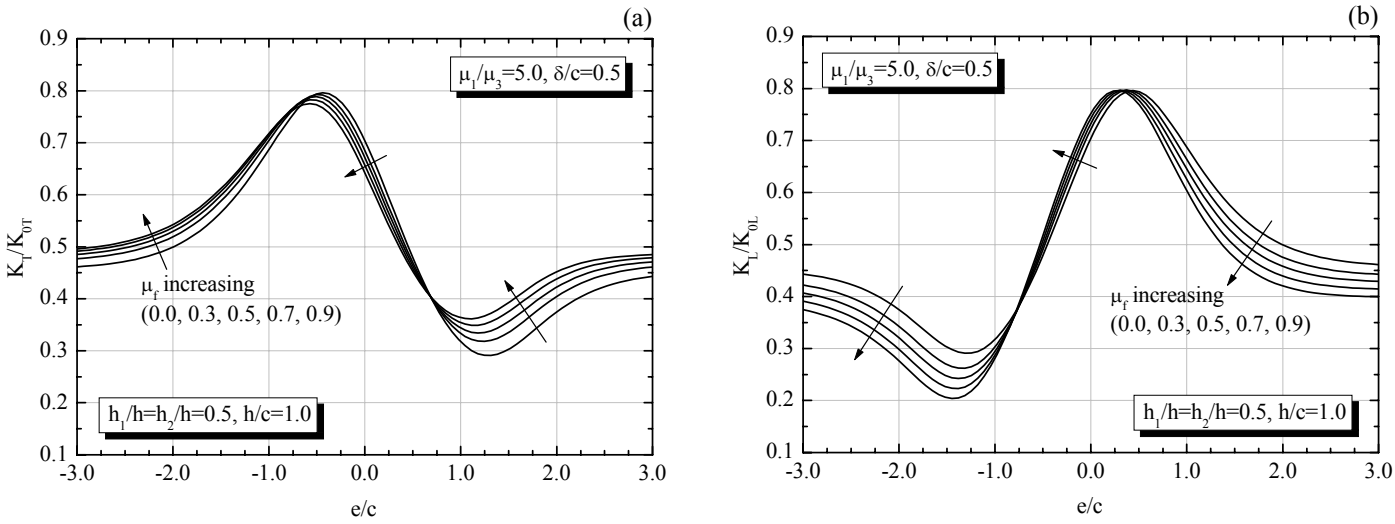

Figure 13. Variations of punch-edge stress intensity factors (a) K_T/K_{0T} and (b) K_L/K_{0L} versus punch location e/c for different values of friction coefficient μ_f (μ_1/μ_3=5.0, δ/c=0.5, $h_1/h=h_2/h$=0.5, h/c=1.0, $K_{0T}=\sigma_0(2\delta)^{-\omega}$, $K_{0L}=\sigma_0(2\delta)^{-\chi}$, $\sigma_0=P/2\delta$).