

Figures for Manuscript:
Modeling and Control of Anterior-Posterior and
Medial-Lateral Sways in Standing Posture

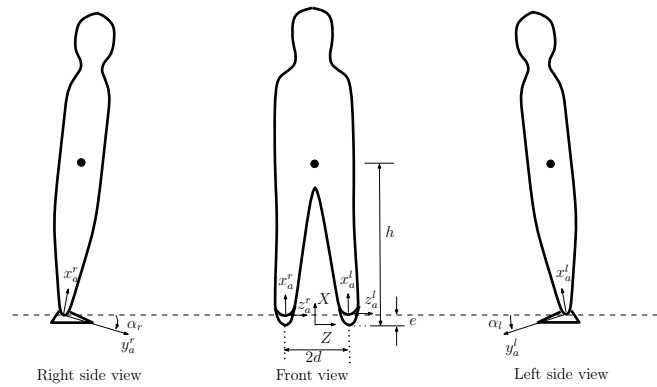


Figure 1: Reference and ankle frames, and anterior-posterior sways with angles α_l and α_r

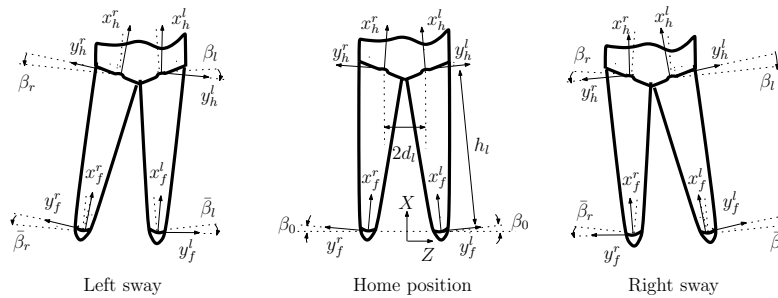


Figure 2: Hip and ankle frames, and medial-lateral sways with angles β_l , β_r , $\bar{\beta}_l$ and $\bar{\beta}_r$

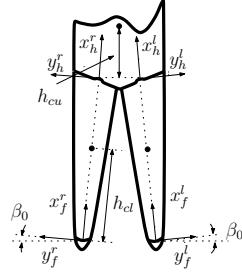


Figure 3: CoMs of the upper body and legs

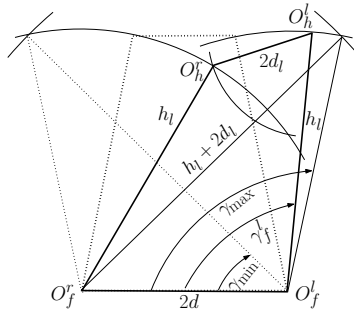


Figure 4: Convex quadrilateral formed by the origins of frames F_f^u and F_h^u for $u = l, r$

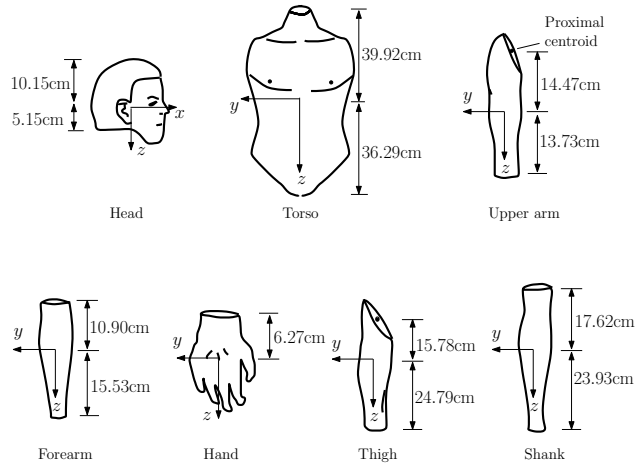


Figure 5: Segmental frames and longitudinal CoM positions

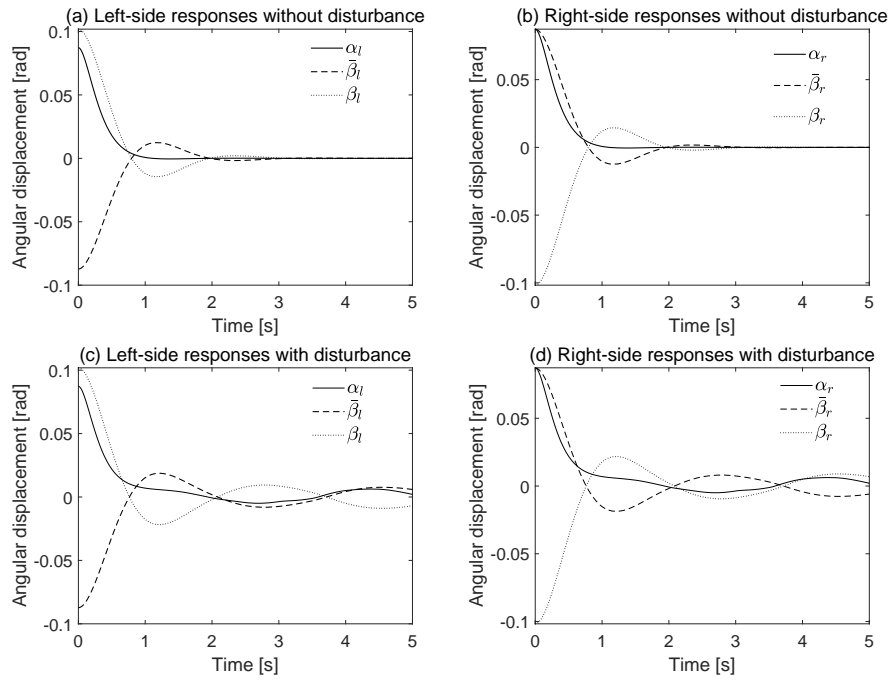


Figure 6: Responses of the controlled posture with movements at the ankle and hip joints. (a) and (b): left and right ankle and hip angles start from non-zero positions and converge to zero in the absence of disturbances; (c) and (d): left and right ankle and hip angles start from non-zero positions and converge towards and vibrate in the vicinity of zero in the presence of disturbances.

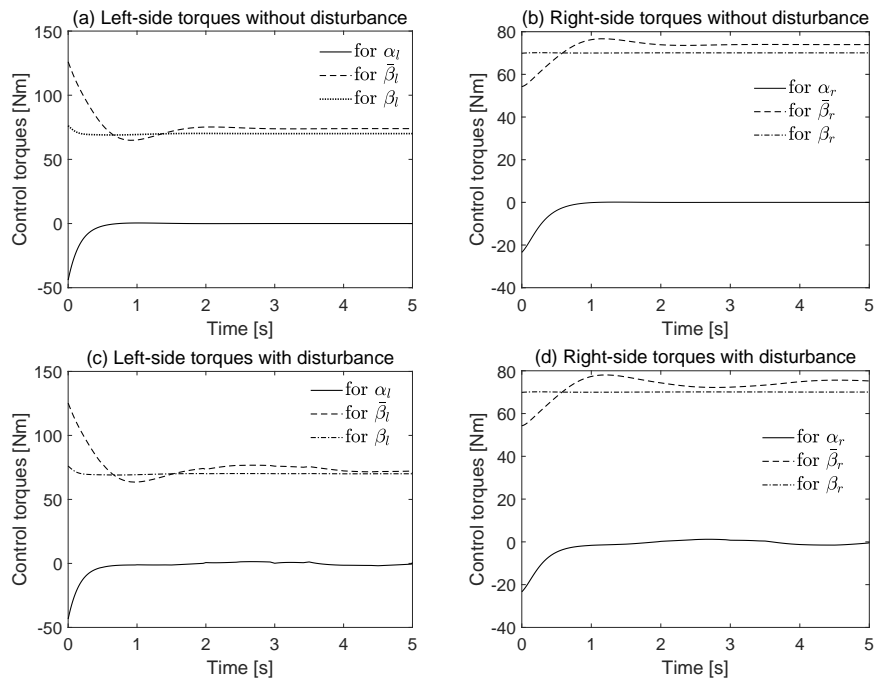


Figure 7: Ankle and hip joint torques. (a) and (b): left and right joint torques in the absence of disturbances; (c) and (d): left and right joint torques in the presence of disturbances.

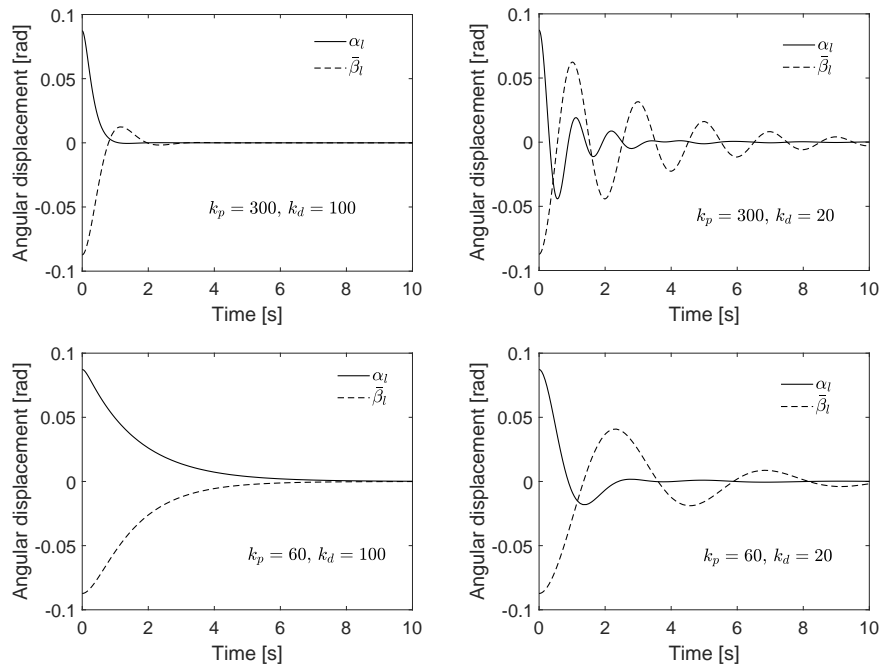


Figure 8: Postural sways under the nonlinear feedback control with different gains.

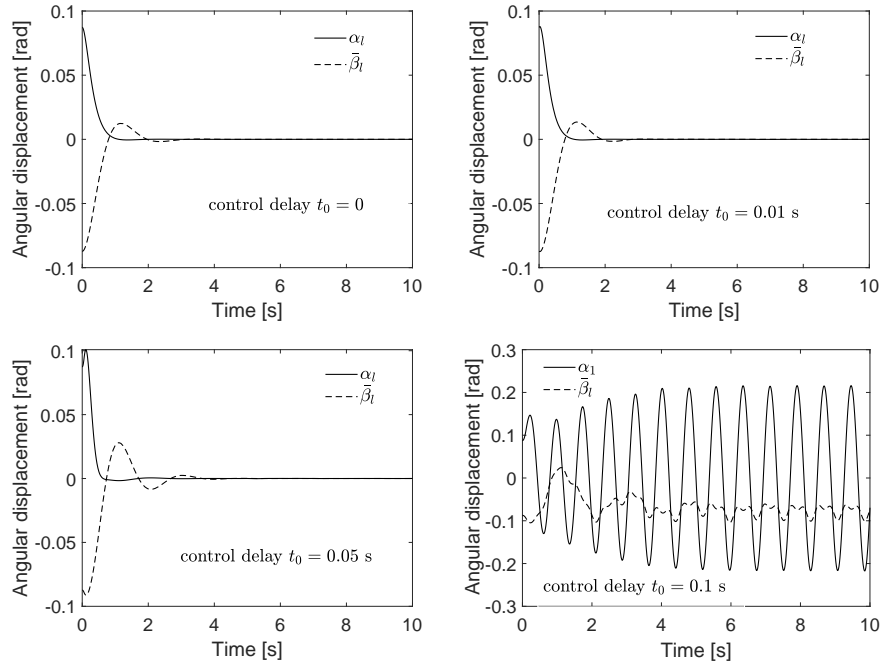


Figure 9: Postural sways under the nonlinear feedback control with time delays.

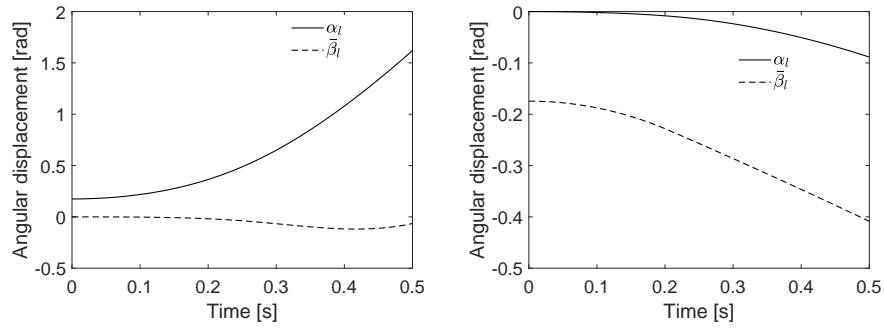


Figure 10: Postural sways during free falls, where only one sway has a non-zero initial angle.