Bibliography

Adolfsson, J., Dankowicz, H., and Nordmark, A. (1998). 3-D stable gait in passive bipedal mechanisms. *Proceedings of the European Mechanics Colloquium on Biology and Technology of Walking.*

Alexander, R. M. (1980). Optimum walking techniques for quadrupeds and bipeds. *J. Zoology, London*, 192:97–117.

Alexander, R. M. (1991). Energy-saving mechanisms in walking and running. *J. Exp. Biol*, 160:55–69.

Alexander, R. M. (1995). Simple models of human motion. *Applied Mechanics Review*, 48:461–469.

Andronov, A. A., Vitt, A. A., and Khaikin, S. E. (1966). *Theory Of Oscillators.* Pergamon Press, Oxford. Dover Edition Printed 1987.

Bach, T. M., Evans, O. M., and Robinson, I. G. A. (1994). Optimization of inertial characteristics of the transfemoral limb prostheses using a computer simulation of human walking. *Proceedings of the Eighth Biennial Conference of the Canadian Society for Biomechanics*, pages 212–213.

Basmajian, J. V. and Tuttle, R. (1973). EMG of locomotion in gorilla and man. In *Control of Posture and Locomotion*, pages 599–609. Plenum Press, New York.

Bechstein, B. and Uhlig, P. (1912). Improvements in and relating to toys. German Patent, No. 7453 (257710).

Beckett, R. and Chang, K. (1973). An evaluation of the kinematics of gait by minimum energy. *Journal of Biomechanics*, pages 147–159.

Beletskii, V. V. (1990). Nonlinear effects in dynamics of controlled two-legged walking. In *Nonlinear Dyanmics in Engineering Systems*, pages 17–26. Springer-Verlag.

Bennet, R. and Cardanha, T. (1991). Dynamic keel project. Report on a dynamic keel to stabilize an otherwise unstable boat. Project advisor: Andy Ruina. Available from the Human Power, Biomechanics, and Robotics Lab at Cornell University.

Bloch, A. M., Krishnaprasad, P. S., Marsden, J. E., and Murray, R. M. (1996). Nonholonomic mechanical systems with symmetry. *Arch. Rat. Mech. An.*, 136:21–99.

Brach, R. M. (1991). *Mechanical Impact Dynamics: Rigid Body Collisions.* John Wiley and Sons, New York.

Brogliato, B. (1996). *Nonsmooth Impact Mechanics: Models, Dynamics and Control.* Springer, London, UK.

Camp, J. (1997). Powered "passive" dynamic walking. Masters of Engineering Project Report, Cornell University. Describes a simple, open-loop powering scheme to produce stable gait on level ground for a two-link biped. Available from the Human Power, Biomechanics, and Robotics Lab at Cornell University.

Chatterjee, A. (1997). *Rigid Body Collisions: Some General Considerations, New Collision Laws, and Some Experimental Data*. PhD thesis, Cornell University.

Chatterjee, A. and Garcia, M. (1998). Small slope implies low speed in passive dynamic walking. Submitted to *Dynamics and Stability of Systems*.

Chatterjee, A. and Ruina, A. (1998). A new algebraic collision law based on impulse space considerations. Conditionally accepted for *Journal Of Applied Mechanics*, under revision.

Coleman, M., Chatterjee, A., and Ruina, A. (1997). Motions of a rimless spoked wheel: A simple 3D system with impacts. *Dynamics and Stability of Systems*, 12(3):139–160.

Coleman, M. J. (1998a). Personal communication. in reference to results from computer simulations.

Coleman, M. J. (1998b). *A Stability Study of a Three-dimensional Passive-Dynamic Model of Human Gait*. PhD thesis, Cornell University, Ithaca, NY.

Coleman, M. J. and Ruina, A. (1998). An uncontrolled walking toy that cannot stand still. *Physical Review Letters*, 80(16):3658–3661.

Collins, J. J. (1995). The redundant nature of locomotor optimization laws. *Journal of Biomechanics*, 28:251–267.

Craig, J. (1989). *Introduction to Robotics*. Addison-Wesley.

Devaney, R. L. (1989). *An Introduction to Chaotic Dynamical Systems.* Addison-Wesley. Second Edition.

Donn, J. M., Porter, D., and Roberts, V. C. (1989). The effect of footwear on the gait patterns of unilateral below-knee amputees. *Prosthetics and Orthotics International*, 13:140–144.

Fallis, G. T. (1888). Walking toy. U. S. Patent, No. 376,588.

Fowble, J. V. and Kuo, A. D. (1996). Stability and control of passive locomotion in 3D. *Proceedings of the Conference on Biomechanics and Neural Control of Movement*, pages 28–29.

Garcia, M. (1998). *Stability, Scaling and Chaos in Passive-Dynamic Gait Models.* PhD thesis, Cornell University, Ithaca, NY.

Garcia, M., Chatterjee, A., and Ruina, A. (1997). Speed, efficiency, and stability of small-slope 2-d passive dynamic bipedal walking. submitted for ICRA98, expanded version in preparation for *International Journal of Robotics Research.*

Garcia, M., Chatterjee, A., Ruina, A., and Coleman, M. (1998). The simplest walking model: Stability, complexity, and scaling. *ASME Journal of Biomechanical Engineering*, 120(2):281–288.

Garcia, M., Ruina, A., Coleman, M., and Chatterjee, A. (1996). Passive-dynamic models of human gait. *Proceedings of the Conference on Biomechanics and Neural Control of Movement*, pages 32–33.

Goldstein, H. (1980). *Classical Mechanics.* Addison-Wesley Publishing Company Inc.

Goswami, A., Espiau, B., and Keramane, A. (1996a). Limit cycles and their stability in a passive bipedal gait. *International Conference on Robotics and Automation.*

Goswami, A., Espiau, B., and Keramane, A. (1997). Limit cycles in a passive compass gait biped and passivity-mimicking control laws. *Journal of Autonomous Robots.* In Press.

Goswami, A., Thuilot, B., and Espiau, B. (1996b). Compass-like bipedal robot part I: Stability and bifurcation of passive gaits. *INRIA Research Report No. 2996.*

Greenwood, D. (1988). *Principles Of Dynamics.* Prentice Hall, Englewood Cliffs, NJ.

Grishin, A. A. and Formalskii, A. M. (1990). Control of bipedal walking robot by means of impulses of finite amplitude. *Izv. AN SSSR. Mekhanika Tverdogo Tela*, 25(2):67–74.

Guckenheimer, J. and Holmes, P. (1983). *Nonlinear Oscillations, Dynamical Systems, and Bifurcations of Vector Fields.* Springer-Verlag, New York.

Hand, R. S. (1988). Comparisons and stability analysis of linearized equations of motion for a basic bicycle model. Master's thesis, Cornell University, Ithaca, NY. Advisors: Andy Ruina & James Papadopoulos.

Hatze, H. (1989). Neuromuscular control systems modeling: A critical survey of recent developments. *IEEE Transactions on Automatic Control*, AC-25:375–385.

Holt, K. G., Jeng, S. F., Ratcliffe, R., and Hamill, J. (1991). Exploring the use of non-linear dynamics in the assessment of stability of human walking. *Annual International Conference of the IEEE Engineering in Medicine and Biology Society*, 13:2212–2213.

Howell, G. W. and Baillieul, J. (1998). Simple controllable walking mechanisms which exhibit bifurcations. To appear in *Proceedings of the 37th IEEE Conference on Decision and Control*.

Hubbard, M. (1979). Lateral dynamics and stability of the skateboard. *Journal of Applied Mechanics*, 46:931–936.

Hurmuzlu, Y. (1987a). Dynamics of bipedal gait I: Objective functions and the contact event of a planar five-link biped. *Journal of Applied Mechanics*, 60:331–336.

Hurmuzlu, Y. (1987b). Dynamics of bipedal gait II: Stability analysis of a planar five-link biped. *Journal of Applied Mechanics*, 60:337–343.

Hurmuzlu, Y., Basdogan, C., and Carollo, J. J. (1993). Presenting joint kinematics of human locomotion using phase plane portraits and poincaré maps. *Journal of Biomechanics*.

Hurmuzlu, Y., Basdogan, C., and Stoianovici, D. (1996). Kinematics and dynamic stability of the locomotion of post-polio patients. *ASME Journal of Biomechanical Engineering*, 118:405–411.

Hurmuzlu, Y. and Moskowitz, G. (1986). The role of impact in the stability of bipedal locomotion. *Dynamics and Stability of Systems*, 1:217–234.

Jensen, R. K. (1993). Human morphology: Its role in the mechanics of movement. *Journal of Biomechanics*, 26:81–94.

Ju, M.-S. and Mansour, J. M. (1988). Simulation of the double-limb support phase of human gait. *Journal of Biomechanical Engineering*, 110:223–229.

Katoh, R. and Mori, M. (1984). Control method of biped locomotion giving asymptotic stability of trajectory. *Automatica*, 20:405–414.

Katz, A. (1994). *Subsonic Airplane Performance.* Society of Automotive Engineers, Warrendale, PA.

Kawasaki, H., Murata, A., and Kanzaki, K. (1996). An efficient algorithm for generating manipulator inertia matrix using the minimum set of inertial parameters. *Journal of Robotic Systems*, 13(5):261–273.

Khalil, W., Bennis, F., and Gautier, M. (1990). The use of generalized links to determine the minimum inertial parameters of robots. *Journal of Robotic Systems*, 7(2):225–242.

Kobetic, R., Marsolais, E. B., and Chizeck, H. J. (1977). Control of kinematics in paraplegic gait by functional electrical stimulation. *Proceedings of the 10th Annual IEEE Conference on Engineering in Medicine and Biology*, page 1579.

Kuo, A. D. (1998). Stabilization of lateral motion in passive dynamic walking. *International Journal Of Robotics Research.* submitted, in review.

Lattanzio, H., Kuenzler, G., and Reading, M. (May 1992). Passive dynamic walking. Project Report, Human Power Lab. Cornell University.

Lin, S.-K. (1995). Minimum linear combinations of the inertia parameters of a manipulator. *IEEE Transactions on Robotics and Automation*, 11(3):360–373.

Luh, J. Y. S., Walker, M. W., and Paul, R. P. C. (1990). On-line computational scheme for mechanical manipulators. *Journal of Dynamic Systems, Measurement, and Control*, 102:69–76.

Margaria, R. (1976). *Biomechanics and Energetics of Muscular Excercise*. Clarendon Press, Oxford.

Marsden, J. and Tromba, A. (1976). *Vector Calculus*. W. H. Freeman and Co., San Francisco.

McGeer, T. (1989). Powered flight, child's play, silly wheels, and walking machines. Technical report, Simon Fraser University, Burnaby, British Columbia, Canada.

McGeer, T. (1990a). Passive dynamic walking. *International Journal of Robotics Research*, 9:62–82.

McGeer, T. (1990b). Passive walking with knees. *Proceedings of the IEEE Conference on Robotics and Automation*, 2:1640–1645.

McGeer, T. (1991). Passive dynamic biped catalogue. In *Proceedings of the 2nd International Symposium of Experimental Robotics*. Springer-Verlag, New York.

McGeer, T. (1992). Principles of walking and running. In *Advances in Comparative and Environmental Physiology*. Springer-Verlag, Berlin.

McGeer, T. (1993a). Computer code for simulation of a 3-d biped. Personal Communication.

McGeer, T. (1993b). Dynamics and control of bipedal locomotion. *Journal of Theoretical Biology*, 163:277–314.

Miura, H. and Shimoyama, I. (1984). Dynamic walking of a biped. *International Journal of Robotics Research*, 3(2):60–74.

Mochon, S. and McMahon, T. (1980). Ballistic walking: An improved model. *Mathematical Biosciences*, 52:241–260.

Moon, F. C. (1992). *Chaotic And Fractal Dynamics: An Introduction For Applied Scientists And Engineers*. Wiley, New York.

Nelson, W. L. (1983). Physical principles for economies of skilled movements. *Biological Cybernetics*, 46:135–147.

Pandy, M. and Berme, N. (1988a). A numerical method for simulating the dynamics of human walking. *Journal of Biomechanics*, 21:1043–1051.

Pandy, M. and Berme, N. (1988b). Synthesis of human walking: A planar model for single support. *Journal of Biomechanics*, 21:1053–1060.

Pandy, M. and Berme, N. (1989). Qualitative assessment of gait determinants during single stance via a three-dimensional model - part i. normal gait. *Journal of Biomechanics*, 22(6/7):717–724.

Raibert, M. H. (1986). *Legged Robots that Balance*. MIT Press, Cambridge, MA.

Rand, R. H. (1994). *Topics In Nonlinear Dynamics With Computer Algebra*. Gordon and Breach Science Publishers.

Rubanovich, E. M. and Formalskii, A. M. (1981). Some aspects of the dynamics of multiple-element systems associated with impact phenomena. *Izv. AN SSSR. Mekhanika Tverdogo Tela*, 16(2):166–174.

Ruina, A. (1998). Non-holonomic stability aspects of piecewise holonomic systems. In press for *Reports on Mathematical Physics*.

Seydel, R. (1988). *From Equilibrium to Chaos: Practical Bifurcation and Stability Analysis*. Elsevier Science Publishing.

Strogatz, S. (1994). *Nonlinear Dynamics and Chaos*. Addison-Wesley, Reading, MA.

Taga, G. (1991). Self-organized control of bipedal locomotion by neural oscillators in unpredictable environment. *Biological Cybernetics*, 65:147–159.

Taga, G. (1995). A model of the neuro-musculo-skeletal system for human locomotion I: Emergence of basic gait. *Biological Cybernetics*, 73:97–111.

Thuilot, B., Goswami, A., and Espiau, B. (1997). Bifurcation and chaos in a simple passive bipedal gait. *IEEE International Conference on Robotics and Automation*.

Townshend, M. A. and Tsai, T. C. (1991). Biomechanics and modelling of bipedal climbing and descending. *Journal of Biomechanics*, 18:21–38.

Vaida, P., Anton-Kuchly, B., and Varene, P. (1981). Mechanics and energetics of stilt walking. *Journal Of Applied Physiology*, 51(2):529–532.

Winter, D. A. (1987). *The Biomechanics and Motor Control of Human Gait*. University of Waterloo Press.

Yamaguchi, G. T. and Zajac, F. E. (1990). Restoring unasisted natural gait to paraplegics via functional neuromuscular stimulation: A computer simulation study. *IEEE Transactions on Biomedical Engineering*, 37:886–902.

Yevmenenko, Y. (1996). Passive dynamic walker with knees: A stable physical model. Undergraduate project report describing construction of a physical walker, available from the Human Power, Biomechanics, and Robotics Lab at Cornell University.

Yevmenenko, Y. (1997). Passive dynamic walker with knees: Construction and parameters. Continuation and addition to his 1996 undergraduate report, available from the Human Power, Biomechanics, and Robotics Lab at Cornell University.

Zajac, F. E. and Winters, J. M. (1990). Modeling musculoskeletal movement systems: Joint and body segmental dynamics, musculoskeletal actuation, and neuromuscular control. In *Multiple Muscle Systems: Biomechanics and Movement Organization*, pages 121–148. Springer-Verlag.

Zenkov, D., Bloch, A., and Marsden, J. (1997). The energy-momentum method for the stability of nonholonomic systems. Technical report, University of Michigan.