REFERENCES

- J. J. Craig, Introduction to robotics: mechanics and control, 3/E. Pearson Education India, 2009.
- [2] M. Hillman, "2 rehabilitation robotics from past to present-a historical perspective," in Advances in Rehabilitation Robotics. Springer, 2004, pp. 25–44.
- [3] K. Capek, *RUR (Rossum's universal robots)*. Penguin, 2004.
- [4] E. Stephens and T. Heffernan, "We have always been robots: The history of robots and art," in *Robots and Art.* Springer, 2016, pp. 29–45.
- [5] N. G. Hockstein, C. Gourin, R. Faust, and D. J. Terris, "A history of robots: from science fiction to surgical robotics," *Journal of robotic surgery*, vol. 1, no. 2, pp. 113–118, 2007.
- [6] A. M. Dollar and H. Herr, "Lower extremity exoskeletons and active orthoses: Challenges and state-of-the-art," *IEEE Transactions on robotics*, vol. 24, no. 1, pp. 144–158, 2008.
- [7] J. L. Pons, Wearable robots: biomechatronic exoskeletons. John Wiley & Sons, 2008.
- [8] P. Dario, M. C. Carrozza, E. Guglielmelli, C. Laschi, A. Menciassi, S. Micera, and F. Vecchi, "Robotics as a future and emerging technology: biomimetics, cybernetics, and neuro-robotics in european projects," *IEEE Robotics & Automation Magazine*, vol. 12, no. 2, pp. 29–45, 2005.
- [9] H. Kazerooni, B. Waibel, and S. Kim, "On the stability of robot compliant motion control: Theory and experiments," 1990.

- [10] R. Bogue, "Exoskeletons and robotic prosthetics: a review of recent developments," *Industrial Robot: an international journal*, 2009.
- [11] O. Khatib, K. Yokoi, O. Brock, K. Chang, and A. Casal, "Robots in human environments: Basic autonomous capabilities," *The International Journal of Robotics Research*, vol. 18, no. 7, pp. 684–696, 1999.
- [12] F. Martini *et al.*, Anatomy and Physiology'2007 Ed. Rex Bookstore, Inc., 2006.
- [13] A. Roaas and G. B. Andersson, "Normal range of motion of the hip, knee and ankle joints in male subjects, 30–40 years of age," Acta Orthopaedica Scandinavica, vol. 53, no. 2, pp. 205–208, 1982.
- [14] N. Li, L. Yan, H. Qian, J. Wu, S. Men, and Y. Li, "Design and simulation analysis of an improved lower limb exoskeleton," *Journal of vibroengineering*, vol. 16, no. 7, pp. 3655–3664, 2014.
- [15] M. Cenciarini and A. M. Dollar, "Biomechanical considerations in the design of lower limb exoskeletons," in 2011 IEEE International conference on rehabilitation robotics. IEEE, 2011, pp. 1–6.
- [16] B. Kalita, J. Narayan, and S. K. Dwivedy, "Development of active lower limb robotic-based orthosis and exoskeleton devices: A systematic review," *International Journal of Social Robotics*, pp. 1–19, 2020.
- [17] A. Zoss, H. Kazerooni, and A. Chu, "On the mechanical design of the berkeley lower extremity exoskeleton (bleex)," in 2005 IEEE/RSJ international conference on intelligent robots and systems. IEEE, 2005, pp. 3465–3472.
- [18] A. B. Zoss, H. Kazerooni, and A. Chu, "Biomechanical design of the berkeley lower extremity exoskeleton (bleex)," *IEEE/ASME Transactions on mechatronics*, vol. 11, no. 2, pp. 128–138, 2006.
- [19] S. Marcheschi, F. Salsedo, M. Fontana, and M. Bergamasco, "Body extender: Whole body exoskeleton for human power augmentation," in 2011 IEEE

international conference on robotics and automation. IEEE, 2011, pp. 611–616.

- [20] Y. W. Hong, Y. King, W. Yeo, C. Ting, Y. Chuah, J. Lee, and E.-T. Chok, "Lower extremity exoskeleton: review and challenges surrounding the technology and its role in rehabilitation of lower limbs," *Australian Journal of Basic and Applied Sciences*, vol. 7, no. 7, pp. 520–524, 2013.
- [21] R. Huang, H. Cheng, H. Guo, Q. Chen, and X. Lin, "Hierarchical interactive learning for a human-powered augmentation lower exoskeleton," in 2016 *IEEE international conference on robotics and automation (ICRA)*. IEEE, 2016, pp. 257–263.
- [22] S. Wang, L. Wang, C. Meijneke, E. Van Asseldonk, T. Hoellinger, G. Cheron, Y. Ivanenko, V. La Scaleia, F. Sylos-Labini, M. Molinari *et al.*, "Design and control of the mindwalker exoskeleton," *IEEE transactions on neural systems and rehabilitation engineering*, vol. 23, no. 2, pp. 277–286, 2014.
- [23] J. Gancet, M. Ilzkovitz, E. Motard, Y. Nevatia, P. Letier, D. De Weerdt, G. Cheron, T. Hoellinger, K. Seetharaman, M. Petieau *et al.*, "Mindwalker: Going one step further with assistive lower limbs exoskeleton for sci condition subjects," in 2012 4th IEEE RAS & EMBS International Conference on Biomedical Robotics and Biomechatronics (BioRob). IEEE, 2012, pp. 1794– 1800.
- [24] E. Watson, "Posts tagged spinal cord injury."
- [25] O. Baser, H. Kizilhan, and E. Kilic, "Biomimetic compliant lower limb exoskeleton (biocomex) and its experimental evaluation," *Journal of the Brazilian Society of Mechanical Sciences and Engineering*, vol. 41, no. 5, p. 226, 2019.
- [26] X. Ouyang, S. Ding, B. Fan, P. Y. Li, and H. Yang, "Development of a novel compact hydraulic power unit for the exoskeleton robot," *Mechatronics*, vol. 38, pp. 68–75, 2016.

- [27] S.-H. Hyon, T. Hayashi, A. Yagi, T. Noda, and J. Morimoto, "Design of hybrid drive exoskeleton robot xor2," in 2013 IEEE/RSJ International Conference on Intelligent Robots and Systems. IEEE, 2013, pp. 4642–4648.
- [28] R. Ranaweera, W. Jayasiri, W. Tharaka, J. Gunasiri, R. Gopura, T. Jayawardena, and G. Mann, "Anthro-x: Anthropomorphic lower extremity exoskeleton robot for power assistance," in 2018 4th International Conference on Control, Automation and Robotics (ICCAR). IEEE, 2018, pp. 82–87.
- [29] Y. Sankai, "Hal: Hybrid assistive limb based on cybernics," in *Robotics research*. Springer, 2010, pp. 25–34.
- [30] T. Nakamura, K. Saito, Z. Wang, and K. Kosuge, "Realizing modelbased wearable antigravity muscles support with dynamics terms," in 2005 IEEE/RSJ International Conference on Intelligent Robots and Systems. IEEE, 2005, pp. 2694–2699.
- [31] H. He and K. Kiguchi, "A study on emg-based control of exoskeleton robots for human lower-limb motion assist," in 2007 6th International Special Topic Conference on Information Technology Applications in Biomedicine. IEEE, 2007, pp. 292–295.
- [32] F. Chen, Y. Yu, Y. Ge, J. Sun, and X. Deng, "Wpal for enhancing human strength and endurance during walking," in 2007 International Conference on Information Acquisition. IEEE, 2007, pp. 487–491.
- [33] F. Chen, Y. Yu, Y. Ge, and Y. Fang, "Wpal for human power assist during walking using dynamic equation," in 2009 International Conference on Mechatronics and Automation. IEEE, 2009, pp. 1039–1043.
- [34] M. Bortole, A. Venkatakrishnan, F. Zhu, J. C. Moreno, G. E. Francisco, J. L. Pons, and J. L. Contreras-Vidal, "The h2 robotic exoskeleton for gait rehabilitation after stroke: early findings from a clinical study," *Journal of neuroengineering and rehabilitation*, vol. 12, no. 1, p. 54, 2015.

- [35] J. Vaughan-Graham, D. Brooks, L. Rose, G. Nejat, J. Pons, and K. Patterson, "Exoskeleton use in post-stroke gait rehabilitation: a qualitative study of the perspectives of persons post-stroke and physiotherapists," *Journal of neuroengineering and rehabilitation*, vol. 17, no. 1, pp. 1–15, 2020.
- [36] X. Zhang and M. Hashimoto, "Sbc for motion assist using neural oscillator," in 2009 IEEE International Conference on Robotics and Automation. IEEE, 2009, pp. 659–664.
- [37] A. Esquenazi, M. Talaty, A. Packel, and M. Saulino, "The rewalk powered exoskeleton to restore ambulatory function to individuals with thoracic-level motor-complete spinal cord injury," *American journal of physical medicine* & rehabilitation, vol. 91, no. 11, pp. 911–921, 2012.
- [38] N. Aphiratsakun and M. Parnichkun, "Balancing control of ait leg exoskeleton using zmp based flc," *International Journal of Advanced Robotic Systems*, vol. 6, no. 4, p. 34, 2009.
- [39] N. Aphiratsakun, K. Chirungsarpsook, and M. Parnichkun, "Design and balancing control of ait leg exoskeleton-i (alex-i)." in *ICINCO-RA* (1), 2008, pp. 151–158.
- [40] I. Pecoraro, N. Tagliamonte, C. Tamantini, F. Cordella, F. Bentivoglio, I. Pisotta, A. Bigioni, F. Tamburella, M. Lorusso, P. Argentieri *et al.*, "Psychophysiological assessment of exoskeleton-assisted treadmill walking," in *International Conference on NeuroRehabilitation*. Springer, 2020, pp. 201– 205.
- [41] K. Kong and D. Jeon, "Design and control of an exoskeleton for the elderly and patients," *IEEE/ASME Transactions on mechatronics*, vol. 11, no. 4, pp. 428–432, 2006.
- [42] T. Yan, M. Cempini, C. M. Oddo, and N. Vitiello, "Review of assistive strategies in powered lower-limb orthoses and exoskeletons," *Robotics and Autonomous Systems*, vol. 64, pp. 120–136, 2015.

- [43] G. Belforte, G. Eula, S. Appendino, and S. Sirolli, "Pneumatic interactive gait rehabilitation orthosis: design and preliminary testing," *Proceedings of* the Institution of Mechanical Engineers, Part H: Journal of Engineering in Medicine, vol. 225, no. 2, pp. 158–169, 2011.
- [44] T.-J. Yeh, M.-J. Wu, T.-J. Lu, F.-K. Wu, and C.-R. Huang, "Control of mckibben pneumatic muscles for a power-assist, lower-limb orthosis," *Mechatronics*, vol. 20, no. 6, pp. 686–697, 2010.
- [45] G. S. Sawicki and D. P. Ferris, "Powered ankle exoskeletons reveal the metabolic cost of plantar flexor mechanical work during walking with longer steps at constant step frequency," *Journal of Experimental Biology*, vol. 212, no. 1, pp. 21–31, 2009.
- [46] D. Shi, W. Zhang, W. Zhang, and X. Ding, "A review on lower limb rehabilitation exoskeleton robots," *Chinese Journal of Mechanical Engineering*, vol. 32, no. 1, pp. 1–11, 2019.
- [47] R. Ekkelenkamp, J. Veneman, and H. Van Der Kooij, "Lopes: a lower extremity powered exoskeleton," in *Proceedings 2007 IEEE International Conference on Robotics and Automation*. IEEE, 2007, pp. 3132–3133.
- [48] K. N. Winfree, P. Stegall, and S. K. Agrawal, "Design of a minimally constraining, passively supported gait training exoskeleton: Alex ii," in 2011 IEEE International Conference on Rehabilitation Robotics. IEEE, 2011, pp. 1–6.
- [49] W.-Y. Lai, H. Ma, W.-H. Liao, D. T.-P. Fong, and K.-M. Chan, "Hip-knee control for gait assistance with powered knee orthosis," in 2013 IEEE international conference on robotics and biomimetics (ROBIO). IEEE, 2013, pp. 762–767.
- [50] J. E. Pratt, C. J. Morse, and S. H. Collins, "2004," the roboknee: An exoskeleton for enhancing strength and endurance during walking," in *Pro*-

ceedings of the IEEE Int. Conference on Robotics and Automation (ICRA. Citeseer.

- [51] P. Moreira, P. Ramôa, L. F. Silva, and P. Flores, "On the biomechanical design of stance control knee ankle foot orthosis (sckafo)," 2011.
- [52] A. N. Spring, J. Kofman, and E. D. Lemaire, "Design and evaluation of an orthotic knee-extension assist," *IEEE Transactions on Neural Systems and Rehabilitation Engineering*, vol. 20, no. 5, pp. 678–687, 2012.
- [53] K. Low, "Robot-assisted gait rehabilitation: From exoskeletons to gait systems," in 2011 Defense Science Research Conference and Expo (DSR). IEEE, 2011, pp. 1–10.
- [54] S. M. Cain, K. E. Gordon, and D. P. Ferris, "Locomotor adaptation to a powered ankle-foot orthosis depends on control method," *Journal of neuro*engineering and rehabilitation, vol. 4, no. 1, pp. 1–13, 2007.
- [55] M. G. Alvarez-Perez, M. A. Garcia-Murillo, and J. J. Cervantes-Sánchez, "Robot-assisted ankle rehabilitation: a review," *Disability and Rehabilitation: Assistive Technology*, vol. 15, no. 4, pp. 394–408, 2020.
- [56] R. Paranjape, J. Mahovsky, L. Benedicenti, and Z. Koles, "The electroencephalogram as a biometric," in *Canadian Conference on Electrical and Computer Engineering 2001. Conference Proceedings (Cat. No. 01TH8555)*, vol. 2. IEEE, 2001, pp. 1363–1366.
- [57] E. Criswell, Cram's introduction to surface electromyography. Jones & Bartlett Publishers, 2010.
- [58] M. Cifrek, V. Medved, S. Tonković, and S. Ostojić, "Surface emg based muscle fatigue evaluation in biomechanics," *Clinical biomechanics*, vol. 24, no. 4, pp. 327–340, 2009.

- [59] M. A. Islam, K. Sundaraj, R. B. Ahmad, and N. U. Ahamed, "Mechanomyogram for muscle function assessment: a review," *PloS one*, vol. 8, no. 3, p. e58902, 2013.
- [60] D. A. Yungher, M. T. Wininger, J. Barr, W. Craelius, and A. J. Threlkeld, "Surface muscle pressure as a measure of active and passive behavior of muscles during gait," *Medical engineering & physics*, vol. 33, no. 4, pp. 464– 471, 2011.
- [61] G. De Luca, "Fundamental concepts in emg signal acquisition," 2003.
- [62] R. Fluit, M. S. Andersen, S. Kolk, N. Verdonschot, and H. F. Koopman, "Prediction of ground reaction forces and moments during various activities of daily living," *Journal of biomechanics*, vol. 47, no. 10, pp. 2321–2329, 2014.
- [63] D. A. Winter, Biomechanics and motor control of human movement. John Wiley & Sons, 2009.
- [64] B. D. Mowery, "The paired t-test," *Pediatric nursing*, vol. 37, no. 6, pp. 320–322, 2011.
- [65] G. Borg, Borg's perceived exertion and pain scales. Human kinetics, 1998.