Low-impedance robotic mechanics: Notes from human physiology and biomechanics

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We will discuss what it means for a system, for a robot, to be "low impedance", and explore when low-impedance systems are at advantage. The human body has many physiological elements that are a source of insight and ideas into reducing the mass, friction, and stiffness of robots that aspire to a similar level of performance. Recent results on ultra-light and ultra-low friction hydrostatic transmissions will be presented, including relevant sources of biological inspiration. This technology, and biologically-inspired low-impedance design generally, will continue to impact many important applications, including medical robots, prosthetics, and autonomous robotic manipulation systems for elder care.

Bio: Peter Whitney is assistant professor of Mechanical and Industrial Engineering at Northeastern University, and formerly an associate research scientist at Disney Research (Pittsburgh/CMU campus). His primary research focus is materials, manufacturing, and mechanical design of robot systems, with a focus on low-impedance mechanics and mechanisms, and human-safe and human-interactive robots. He obtained the PhD at Harvard under Robert Wood, and his SM (Aeronautics and Astronautics) and SB (Physics) from MIT. His work has been widely impactful, including as the first-post on Reddit, and featured prominently (more than once!) on his parents' refrigerator door.