

Biography

Prof. Jun Ho Oh(58) received his B.S. and M.S. degree from Yonsei University, Seoul, Korea in 1977 and 1979, respectively. After short working at Korea Atomic Energy Research Institute as a researcher from 1979 to 1981, he received Ph.D. degree in mechanical engineering in the field of automatic control at U.C., Berkeley in 1985. He is now a distinguished professor of mechanical engineering and the director of Humanoid robot research center(Hubo Lab) at Korea Advanced Institute of Science and Technology (KAIST).

He performed many industry and government research projects in motion control, sensors, microprocessor applications, and robotics, etc. He is especially interested in mechatronics and system integration. In the recently ten years, he completed unique humanoid robot series KHR-1, KHR-2, Hubo and Hubo 2. And he also developed Albert Hubo and Hubo FX-1. He is currently studying to improve the performance of humanoid robot for faster and more stable walking, robust robot system integration and light weight design, etc. He is a member of ASME and IEEE. And he also is the member of the National Academy of Engineering of Korea.

Realization of Biped Walking on Humanoid robot, Hubo II

Hubo II is a 40-DOF full size Humanoid Robot with 1.3m of height and 45Kg of weight. The full size humanoid robot quit differs from the toy size small ones in many aspects. It should have very stable and well designed structure with little uncertainties. It must be strong enough to move its body weight but not so heavy to minimize the torques to drive the body parts. All the electrical parts and sensors including force/torque sensors, inertia sensors, all the driver circuits, decentralized control must be designed and fabricated compact enough to be fit in the enclosure of the body.

Another important task is to design walking algorithm. Walking algorithm is composed with two parts: off-line gait pattern design and real time stabilization control. Gait pattern design is to find a periodic function for each joint of leg such that humanoid robot is to walk with desired velocity keeping certain level of stability. We suggested a simple function connected with cubic spline and sine functions with minimal number of parameters. This approach simplifies the parameter adjustment procedure. Play back of gait pattern found from the former process, however, does not guarantee the robot walks in real practice since there are number of uncertainties involved in real situation. The uncertainties include ground inclination, friction, unmodeled vibration of the body. The stabilization algorithm should deal with such kind of problems. Hubo's walk algorithm has 8 levels of hierarchical control architecture to cope with the general circumstances in walking environment. The general issues including mentioned above will be presented.