Keynote Speaker

Biomechanical Properties Measurements Using the Levitation Mass Method (LMM)

Yusaku Fujii^{a,*}

^aGunma University, Kiryu, Japan

*Corresponding Author: fujii@el.gunma-u.ac.jp

Abstract

The interaction between human and machine are important for developing human-friendly machines. Biomechanical properties measurements using the Levitation Mass Method (LMM) are reviewed. The levitation mass method (LMM) has been proposed and improved by authors. In the LMM, an rigid object is levitated with a small friction using an aero-static linear bearing. The total force acting on the object (the moving part of the bearing) is measured as the product of mass and acceleration of the object, i.e. $F=Ma$. In the method, only the Doppler shift frequency of the laser beam reflected by the object is accurately measured using an optical interferometer. Subsequently, the velocity, position, acceleration, and inertial force of the object are calculated from this frequency. Force controllability of human arm, impact response of human arm and impact response of human palm are accurately measured using the LMM. The deeper understanding of properties/functions of human is important for improving the all the fields of engineering, since all the engineering should be for improving human life. In the speech, the present status and the future prospect of our research are discussed.