

## **Mathematical modeling of human body for lifting task**

### **Abstract**

Physical lifting tasks commonly involve to types of body postures, namely, squat lifting and stoop lifting. Studies shows improper body posture during lifting task has detrimental effect to human lower-back region over extended period of time. This is because generally, squat-lifting posture exerts relatively higher moments and compression forces on human back than stoop lifting posture. However, this claim was never thoroughly examined and validated from mathematical model approach. This paper proposes a mathematical model to represent the lower extremity of human body during lifting tasks, based on a two-link kinematic open chain in two dimensional spaces. Thus, all moment of torque and their effect to every part of lower extremity of human body can be thoroughly analyzed.

**Keywords** — Lifting techniques, mathematical model, Kane'smethod, motion analysis.