

Identification of muscle forces of upper limbs based on the registration of motion capture system

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Abstract: The biomechanical model of the human body with the aim of identification of the muscles forces of the upper limb during basic activities is proposed in the paper. In the assumed multibody model of the human body which is relatively simple, the body segments are treated as rigid bodies interconnected via ideal joints, and only the forces of the main muscles of the upper limbs are taken into account. At other joints of the model are identified the torques produced by whole groups of the muscles. The equations of motion are obtained using the Lagrange formalism. Such a description allows to determining the forces and the torques generated by the human muscles for any considered motion, where the geometrical and mass properties of the body segments, and their velocities and accelerations are known. The necessary data concerning the chosen kind of motion of the human body are registered and collected by the system BTS dedicated to the analysis of motion. The proposed mechanical model together with its mathematical description and the optimization method applied could be useful to more accurate research of human muscles work properties, and overloading of the joints during many human physical activities.

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