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FEMALE HUMAN BODY MODELLING FOR STUDY OF MASS–INERTIAL CHARACTERISTICS

Gergana Nikolova, Vladimir Kotev, Daniel Dantchev

Bulgarian Academy of Sciences, Bulgaria
gergana1973@gmail.com, kotev@imbm.bas.bg, danieldantchev@gmail.com

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Summary: The knowledge of mass-inertial characteristics of the human body is a basic prerequisite for the human movement analysis in many biomechanical activities. Unfortunately, most of the data about mass-inertial parameters available in literature concerns males. In additions, in the rear cases when such data for women are reported, almost all of them are about the different segments, not for the body as a whole. In the current article we will present a 3D model of the female body and with the help of it computer realization within the SolidWorks media will provide data for the mass-inertial parameters of the female body in few basic positions. The aim of the current work is: 1) to propose 16-segmental biomechanical model of the female body and to generate that model within a SolidWorks medium 2) to verify the model via comparing the results for the mass-inertial characteristics of the body obtained within the model with the analytical results from our previous investigation; 3) to obtain new results for the mass-inertial characteristics of the whole female human body of the average Bulgarian female on the basis of the model in various body positions. In the current article, we accomplished the above program and report data for the mass-inertial parameters of the female body in few basic positions, e.g. the standing position and the sitting position. The comparison performed between our model results and data reported in literature gives us confidence that this model could be reliably used to calculate these characteristics at any another posture of the body of interest when studying these parameters related to problems appearing in the everyday live, work, leisure, sport, criminology, in human movement analysis, rehabilitation, in space exploration with the participation of female astronauts, to properly design wearable or rehabilitation robots and devices etc.