

# 3D Model and Main Geometric and Mass-inertial Characteristics of the Bulgarian Man

Gergana S. Nikolova

Institute of Mechanics, Bulgarian Academy of Sciences, Department of Biomechanics, Acad., G. Bonchev Str., Building 4, Sofia 1113, Bulgaria  
gergana1973@gmail.com

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The study of geometric and mass-inertial parameters is important for biomechanical analyses of human motion. In the current study a 3D geometrical model of the body of the average Bulgarian man is presented which is based on the data taken from a representative anthropological investigation (2435 males aged between 30 and 40 years) [1]. The model consists of 14 segments which are assumed to be relatively simple geometrical bodies like frustum of cone, ellipsoid, etc., and is oriented to applications in medicine, sport and ergonomics. We construct the "average" Bulgarian man that turns out to be with height 1.77 m and mass 77.7 kg on the basis of the values measured on 2435 male individuals in the above investigation. Using the proposed 3D model and the corresponding segmentation of the body, we calculate analytically and estimate numerically the mass and volume of the segments, as well as their center of mass position and inertial characteristics. Wherever possible we also present a comparison with the data available in literature for other Caucasian and observe a good agreement with the results of our model.

## References

- [1] Yordanov Y., Nacheva A., Tornjova S., Dimitrova B., Topalova D., 2006 *Anthropology of the Bulgarian population at the end of the 20th century (30-40 years old persons)*, Professor Marin Drinov Academic Publishing House, Sofia, Bulgaria .