

SCIENTIFIC-EDUCATIONAL WEB SITE "COMPUTER TECHNOLOGY IN MECHANICS"

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Scientific-educational site "Computer technologies in mechanics" [1] was created to demonstrate the capabilities of modern computer technologies in the field of theoretical mechanics. A one-wheeled robot [2] in the form of a homogeneous circular disk that rolls without slipping on a fixed plane is considered as an example of a mechanical system. The construction and the study of equations of motion of wheeled vehicles, systems with nonholonomic constraints, are time-consuming and cumbersome procedures [3]. The use of computer technologies accelerates the research process, including through the three-dimensional visualization of system motions. The site contains a description of the algorithms and realizing their program of the construction, the study of equations of motion, the creating of geometric illustrations and parameterized animations of mechanical systems with nonholonomic constraints motions in the language of Mathematica. The presented video with music can be used in lectures and practical exercises to study the stability, steady motions of mechanical systems and other themes. Codes of programs can be freely copied from the screen and allow the direct application to model, course, diploma, dissertation papers on various subjects, if a reference to the sources [1,4] will be made.

References

1. *Kapustina O.M., Martynenko Y.G.* "Computer technologies in mechanics" // web site <https://sites.google.com/site/comptechmechanics/>
2. *Y. G. Martynenko, A. V. Lenskii, A. I. Kobrin,* "[Decomposition of the Problem of Controlling a Mobile One-Wheel Robot with an Unperturbed Gyrostabilized Platform,](#)" *Doklady Physics*, 47(10), 2002 pp. 772–774.
3. *Markeev A.P.* Dynamics of a body being contiguous to a rigid surface // Moscow: Nauka, 1991, 336 p.
4. *Kapustina O., Martynenko Y.* One-Wheeled Robot-Gyrostat // <http://demonstrations.wolfram.com/OneWheeledRobotGyrostat/>