Forward and Inverse robotics kinematics JavaScript-HTML5 simulator

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Abstract

The development of technology nowadays, and specifically in the field of robotics, is an increasingly developed field of research and development by the scientific community to optimize its productivity. Although many papers report on software dealing with robots and similar devices, their development is usually through complex and sophisticated software, whereas something simpler at the programming level may be presented. This paper serves as an introduction to robots, introducing fundamental mathematical concepts and exploring related studies. It begins with a brief literature review of related works by analyzing them in some depth about what they address and how they relate to the present work. It then delves into the mathematics behind a 2DOF (degrees of freedom) robot, elucidating the principles necessary for its operation through mathematical explanations. The code and some pseudocode are then provided, which is made available as open source code for testing and downloading purposes. Thus, the whole picture of the software created is synthesized. Then the performance of the software is evaluated and compared with the results obtained from Matlab, for different use cases of the software. The conclusion highlights the possible applications of the software, highlighting its simplicity and high adaptability as well as any limitations it enjoys due to the Javascript language. In addition, ideas for future features are outlined that will expand the software's capabilities with new features.