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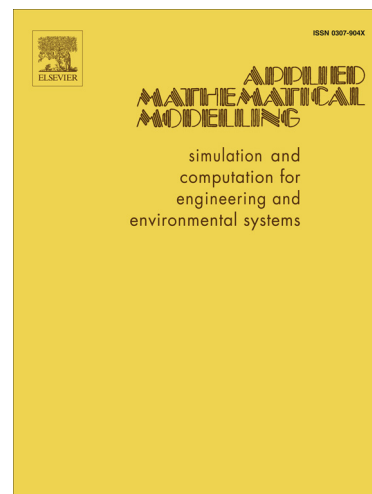
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# The significance of adopted Lagrange's principle of virtual work used for modeling aerial robots<sup>☆</sup>

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## Abstract

This paper presents a novel approach for kinematic and dynamic (kinetic) modeling of the selected aerial robot type, named *CPR – A*. The presented *CPR – A* system has three motors and two ropes connected together with a camera which can move in the 3D parallelepiped workspace. The *CPR – A* workspace is maximized for non-redundant construction. The unique kinematic model of the considered system represents the fundamental base for its dynamic model. This complex model accurately represents a real *CPR – A* system, which can be used for various tasks by implementing intelligent control systems. The validity of the results has been presented through five case studies using newly developed software package *AIRCAMA*. The purpose of this research is to implement the presented results and possibly advance the model for future endeavors, autonomy and intelligent behavior of aerial robots.

*Keywords:* aerial robot; calculation of workspace; kinematic modelling; Jacobian matrix; trajectory planning; dynamic modeling.

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## Nomenclature

*DOF*

Degree Of Freedom

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