A Study of Quaternion in Terms of Indicial Notation

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Abstract

The conventional approach using unabridged format to manipulate the algebraic properties of quaternion is very cumbersome. In order to manipulate the algebra more easily or more effectively, we attempt to use the indicial notation in the quaternion. Although some authors did use the indicial notation to deal with quaternion, they merely applied it to the pure quaternion, which contains the vector part without the scalar part. In this paper, the quaternion of which we take into account is in general form, i.e. including both of the scalar part and vector part of the quaternion. A concise survey on quaternion properties with proofs using indicial notation for some known results is presented here. Additionally, three examples are used to illustrate the application of the quaternion in the rigid motion and the robotics etc.

Keyword：indicial notation, quaternion, rigid motion, robotics