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Using Lagrange Equations to Study the Relative Motion of a Mechanism

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Abstract : The relative motion of a robotic arm formed by homogeneous bars of different lengths and masses, hinged to each other is investigated. The first bar of the mechanism is articulated on a platform, considered initially fixed on the surface of the Earth, while for the second case the platform is considered to be in rotation with respect to the Earth. For both analyzed cases the motion equations are determined using the Lagrangian formalism, applied in its traditional form, valid with respect to an inertial reference system, conventionally considered as fixed. However, in the second case, a generalized form of the formalism valid with respect to a non-inertial reference frame will also be applied. The numerical calculations were performed using a MATLAB program.

Keywords : Lagrange equations, relative motion, inertial reference frame, non-inertial reference frame
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