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Solid-Liquid-Solid Interface of Yakam Matrix: Mathematical Modeling of the Contact Between an Aircraft Landing Gear and a Wet Pavement

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Abstract : A mathematical model is developed to describe the contact dynamics between the landing gear wheels of an aircraft and a wet pavement during landing. The model is based on nonlinear partial differential equations, using the Yakam Matrix to account for the interaction between solid, liquid, and solid phases. This framework incorporates the influence of environmental factors, particularly water or rain on the runway, on braking performance and aircraft stability. Given the absence of exact analytical solutions, our approach enhances the understanding of key physical phenomena, including Coulomb friction forces, hydrodynamic effects, and the deformation of the pavement under the aircraft's load. Additionally, the dynamics of aquaplaning are simulated numerically to estimate the braking performance limits on wet surfaces, thereby contributing to strategies aimed at minimizing risk during landing on wet runways.

Keywords : aircraft, modeling, simulation, yakam matrix, contact, wet runway
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