

COUPLED PROBLEMS 2021

Invited Session (IS): organizer Jacques Periaux (CIMNE, Spain)

Title: Unsteady Interaction of Aerodynamics with Wing Structure in Gust Load Control

Author: N Qin, University of Sheffield, United Kingdom

Abstract:

In this presentation, I will first introduce some recent work on the various ways to control the unsteady wing load induced by gust encounter. This is crucially important for the safety of future civil aviation. In addition, the effective alleviation of gust load can also potentially pave the way for a significant reduction of aircraft fuel consumption through reduced structural weight and therefore drag. Since no practical wing is rigid, this leads to a strongly-coupled problem between the wing aerodynamics and its structure under the unsteady gust load. The solution of this coupled problem will be discussed in some detail, including the analysis of the unsteady gust response without and with flow control.