Università di Genova

DICCA DIPARTIMENTO DI INGEGNERIA CIVILE, CHIMICA E AMBIENTALE

DICCA SEMINARS

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ETH

"A hybrid approach to condition monitoring relying on fusion of data and models"

ABSTRACT

The monitoring of the condition of structural systems operating under diverse dynamic loads involves the tasks of simulation (forward engineering), identification (inverse engineering) and maintenance/control actions. The efficient and successful implementation of these tasks is however non-trivial, due to the ever-changing nature of these systems, the variability in their interactive environments, and the polymorphic uncertainties involved. Structural Health Monitoring (SHM) attempts to tackle these challenges by exploiting information stemming from sensor networks. SHM comprises a hierarchy across levels of increasing complexity aiming to i) detect damage, ii) localize and iii) quantify damage, and iv) finally offer a prognosis over the system's residual life. When considering higher levels in this hierarchy, including in-depth damage assessment and even performance prognosis, purely data-driven methods are found to be lacking. For higher-level SHM tasks, or for furnishing a digital twin of a monitored structure, it is necessary to integrate the knowledge stemming from physics-based representations that rely on the underlying mechanics. This talk discusses implementation of such a hybrid approach to SHM for tackling the aforementioned challenges with example applications on diverse infrastructure components, including civil, aerospace and wind energy structures.

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Streaming on the Teams channel: wlp9vyt

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