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INVERSE WIND LOAD RECONSTRUCTION WITH APPLICATION TO WIND TURBINE STRUCTURES

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ABSTRACT

With growing demands for clean energy, wind turbines play a significant role as a renewable energy source. In order to reduce the general costs of wind turbine structures, it is very useful to get a better knowledge on wind load time histories acting on the structure in order to reduce design uncertainties. This knowledge can also be used to utilize fatigue assessment procedures, damage diagnosis and life-time forecast. Since the wind load in most cases cannot be measured directly, a possible alternative is to inversely identify the wind load using structural response measurements gained through structural health monitoring. In the past, many authors dealt with inverse load reconstruction using different approaches, but not much research has been done in the field of wind load identification for wind turbine structures. This paper gives an overview of methodologies that can be used to reconstruct the wind load, as well as their applicability for a more precise design of land-based wind turbines.

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