

Nonlinear Dynamic Response of Helical Gear with Torque-Limiter

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Abstract : This paper investigates the nonlinear dynamic response of a mechanical torque limiter which is used to protect drive parts from overload (helical transmission gears). The system is driven by four excitations: two external excitations (aerodynamics torque and force) and two internal excitations (two mesh stiffness fluctuations). In this work, we develop a dynamic model with lumped components and 28 degrees of freedom. We use the Runge Kutta step-by-step time integration numerical algorithm to solve the equations of motion obtained by Lagrange formalism. The numerical results have allowed us to identify the sources of vibration in the wind turbine. Also, they are useful to help the designer to make the right design and correctly choose the times for maintenance.

Keywords : two-stage helical gear, lumped model, dynamic response, torque-limiter

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