Dual-laser vibrometry: elimination or extraction of pseudovibration

The principal idea of a method using two identical laser vibrometers to eliminate pseudovibrations occurring as structured noise in laser-vibrometer measurements of angular velocity of a rotating object is investigated. The two vibrometers monitor the same surface path on the rotating object, but are separated by a known angle. In addition, they are aligned in such a way that they observe the same speckle patterns, but with a relative time lag given by the angular separation of the vibrometers and the angular velocity of the object. However, any physical variations in angular velocity of the object occur simultaneously at the two vibrometers. Knowing the angular separation between the vibrometers, simple trigonometry can be used to suppress the pseudovibrations. The experiments demonstrate the principle of the method only and no real-time measurements are presented.
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