

## **Fringe pattern-based vision sensing system for the measurement of dynamic parameters**

Prof. Jianfeng Zhong, Fuzhou University, China

### **ABSTRACT:**

Dynamic measurement is one of the basic technologies in modern industry, whose accuracy and efficiency are of great significance to the development of industrial manufacturing. In recent years, vision-based dynamic measurement technology has been widely concerned and rapidly developed due to its advantages of non-contact, high efficiency, high accuracy, and no loading effect. Aiming at the problem of existing monocular vision measuring techniques in synchronous measurement for structural 3D vibration and rotational parameter measurement, novel displacement-sensitive fringe pattern based dynamic measurement theories, methods and systems were proposed. Synchronous measurement for 3D structural displacement, rotating shaft 3D displacement, rotation angle and rotation speed could be realized by using the novel DSFP as vibration or rotation angular displacement sensor and using a high-speed camera as a detector. The proposed DSFP-based method provides an effective measurement technique for orbit analysis, order analysis of the rotating machinery and dynamic monitoring of non-rotational structures. The experimental results demonstrated the practicability, convenience, accuracy, and reliability of the proposed DSFP -based measurement system. Therefore, the proposed theories and systems provide novel measurement techniques for structural condition monitoring and equipment fault diagnosis, which also demonstrates its potential application value in real engineering.

**Keywords:** Dynamic measurement; Vision-based; Displacement-sensitive fringe pattern; Fault diagnosis