

# Optical Fiber Heterodyning Vibration Sensor

M.E.Khosroshahi, M. Shaikh

Nanobiophotonics & Biomedical Research Lab, MIS Electronics Inc.

## 1. Introduction:

Fiber optic sensors have gained enormous interest in research and development in biomedical applications including diagnostic techniques and industrial usage such as smart structures to monitor various engineering and civil structural components due to their advantages of immunity from electromagnetic interference, real-time, label-free detection, relatively easy instrumentation and low cost. Optical heterodyne detection is a method of extracting information encoded as modulation of the phase, frequency or both of electromagnetic radiation in visible or infrared band. Heterodyne signifies more than one frequency, in contrast to the single frequency employed in homodyne detection. The comparison of the two light signals is typically achieved by combining them in a photodiode detector, with a linear response. Typically, the two light frequencies are similar enough that their difference or beat frequency produced by the detector is in the radio or microwave band that can be conveniently processed by electronic means.

