Abstracts

Passive Demodulation of Optical Interferometric Sensors

E.L. Green and P.G. Cable. "Passive Demodulation of Optical Interferometric Sensors." 1982 Transactions on Microwave Theory and Techniques 30.10 (Oct. 1982 [T-MTT] (Special Issue on Optical Guided Wave Technology)): 1627-1632.

Two techniques for passive (no-feedback) demodulation of signals from a remote two-beam interferometric sensor are discussed. Termed "synthetic heterodyne" and "quadrature recombination," both methods are based on forced sinusoidal modulation of phase within the interferometer. If the phase modulation is generated by linearly proportional frequency modulation of the laser light source, then the interferometer, deployed by means of optical fibers, can be a completely passive remote sensor, and an array of identical sensors can be operated from one light source. The former technique, proposed by Cole, Danver, and Bucaro permits standard FM demodulation. The latter technique, proposed by Cable and Green, employs arithmetic operations that are appropriate to digital implementation. Constraints on application of the technique, especially frequency distribution and amplitude of phase noise (out-of-band) versus signal amplitude (in-band), are analyzed and an implementation is proposed that is consistent with contemporary analog-to-digital conversion technology.

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