


**Low-complexity, optically coherent and self-coherent signal processing (Technion)****code:** COM-1322

Today, the new generation of optical transmission systems is based on coherent detection using local oscillator lasers in the optical receivers. However, with current receivers, existing methods suffer from excess phase noise and are incapable of sustaining large and/or rapid frequency drifts. This drawback of the local oscillator lasers, coupled with the high cost of tunable highly coherent lasers, impede on the advantages of coherent detection. The proposed method is an improved, lower complexity signal processing algorithm for performing carrier recovery (phase and frequency estimation and compensation) for coherent optical detection. The algorithm significantly relaxes the laser requirements. Conversely, for a given laser system, the suppressed phase noise greatly improves performance. Furthermore, this algorithm allows, for the first time, robust, low cost, practical optical transmission systems based on self-coherent detection, attaining the advantages of coherent detection without the local oscillator laser in the receiver.

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