Abstracts

Assessment of the nonlinearity tolerance of different modulation schemes for millimeter-wave fiber-radio systems using MZ modulators

Sen Lin Zhang, P.M. Lane and J.J. O'Reilly. "Assessment of the nonlinearity tolerance of different modulation schemes for millimeter-wave fiber-radio systems using MZ modulators." 1997 Transactions on Microwave Theory and Techniques 45.8 (Aug. 1997, Part II [T-MTT]): 1403-1409.

The nonlinearity tolerance of several higher order modulation schemes, which make efficient use of transmission bandwidth, such as 8-PSK, 16-QAM, and 64-QAM, has been assessed for millimeter-wave fiber-radio systems using a Mach-Zehnder (MZ) modulator for the modulation of an optical carrier. Some other deteriorating factors, such as a bias-point shift in the MZ modulator and optical carrier leakage at the MZ filter, which is used for the separation of the two optical carriers, have also been considered. The assessment was accomplished through computer simulations. It is found that the effect of the nonlinearity of the MZ modulator is less serious for a system using 8-PSK than for a system using 16-QAM or 64-QAM, and that in the latter case, an optimal drive level exists for the modulator to achieve the best system performance. A bias-point shift, required in some deployment scenarios, degrades system performance significantly. A leakage of optical carrier to the wrong port at the MZ filter further degrades the system performance, especially for systems using the 16-QAM or 64-QAM modulation scheme.

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