Modulational Instability of the Higher-Order Nonlinear Schrödinger Equation with Fourth-Order Dispersion and Quintic Nonlinear Terms

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The modulational instability of the higher-order nonlinear Schrödinger equation with fourth-order dispersion and quintic nonlinear terms, describing the propagation of extremely short pulses, is investigated. Several types of gains by modulational instability are shown to exist in both the anomalous and normal dispersion regimes depending on the sign and strength of the higher-order nonlinear terms. The evolution of the modulational instability in both the anomalous and normal dispersion regimes is numerically investigated and the effects of the higher-order dispersion and nonlinear terms on the formation and evolution of the solitons induced by modulational instability are studied. – PACS numbers: 42.65.Tg, 42.81Dp, 42.65Sf

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