Transition region for the modified Korteweg–de Vries equation: from elliptic wave to asymptotic solitons

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Abstract. We consider the (focusing) modified Korteweg-de Vries equation with step-like initial datum, that is, the initial function tends to a positive constant c as x tends to minus infinity, and tends to zero as x tends to plus infinity. The leading edge $x = 4c^2t$ separates the region of vanishing asymptotics and the region of the modulated elliptic wave. We show that the transition region $4c^2t - \varepsilon t < x \leq 4c^2t$ is subdivided into infinitely subregions, in which the asymptotics is described by soliton-like expressions; each subregion is characterized by a different phase shift.

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