Parametrices for the modified Korteweg-de Vries equation in a modulated elliptic wave region

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We consider the Cauchy problem for the modified Korteweg-de Vries equation on the line. The initial function is step-like, that is, it tends to some constants when $x \to \pm\infty$. We study the asymptotical behavior of the solution as $t \to \infty$. Earlier in [2] we got the formula for the main term of the asymptotics in the physically interesting domain $(-6c^2 + \varepsilon)t < x < (4c^2 - \varepsilon)t$. It was obtained from the model Riemann-Hilbert problem, which was explicitly solved in terms of the elliptic functions. Here we justify the transition from the original Riemann-Hilbert problem to the model one. It is done due to the analysis of the so-called parametrices, which are constructed here in terms of the Airy function and its derivative.

References

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