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THE AIRY EQUATIONS WITH IMPULSIVE EFFECT: MULTI-VALUED NONLINEAR PERTURBATIONS

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Abstract. We study the topological regularity of solutions to the Cauchy problem of a (spatial) third-order partial differential equation with a multi-valued perturbation and an impulsive effect. In the framework of the functional space, the principal part of the differential operator corresponds to an Airy operator generating a noncompact C_0-group of unitary operators. Our attention is concerned with the R_δ-structure of the solution set for the Cauchy problem. Geometric aspects of the corresponding solution map are also considered. In our main results, no any compactness condition on the impulsive functions is needed. Moreover, we give illustrating examples for the nonlinearity and impulsive functions.

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Key words and phrases. Cauchy problem of a third-order (in space) PDE; multi-valued perturbation; impulsive effect; solution set; R_δ-structure; R_δ-map.

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