ON THE SOLITON SOLUTIONS OF A FAMILY OF TZITZEICA EQUATIONS

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Abstract. We analyze several types of soliton solutions to a family of Tzitzeica equations. To this end we use two methods for deriving the soliton solutions: the dressing method and Hirota method. The dressing method allows us to derive two types of soliton solutions. The first type corresponds to a set of six symmetrically situated discrete eigenvalues of the Lax operator L; to each soliton of the second type one relates a set of twelve discrete eigenvalues of L. We also outline how one can construct general N soliton solution containing N_1 solitons of first type and N_2 solitons of second type, $N = N_1 + N_2$. The possible singularities of the solitons and the effects of change of variables that relate the different members of Tzitzeica family equations are briefly discussed. All equations allow quasi-regular as well as singular soliton solutions.

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