This is a review text file submitted electronically to MR.

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**Author:** This line will be completed by the MR staff.

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**Primary classification:** 35Q53

**Secondary classification(s):** 37K10 74K05 81Q05

**Review text:**

The paper is, despite its title, about solutions r(x,t)=R(y,t) of the so called Harry-Dym nonlinear partial differential equation constructed by a modification of the method developed by the first author ten year ago. The essence of the method is that there exists a close connection between the Harry-Dym and well known KdV hierarchies so that one can start from the available KdV solutions u(y) of the "one-gap" (i.e., elliptic Weierstrass) and "two-gap" (i.e., Lame) explicit form. In this language, two KdV solutions related by the so called auto-Backlund transformation give rise to a parallel relation between two solutions R(x,t). The core of the message are some explicit formulae and re-interpretations. Traditionally (i.e., in context of the inverse scattering transformation), one treats u(y) as a potential in Schroedinger equation. After a change of variables, the familiar equation for a string is obtained, with a density proportional to an inverse square of r(x,0). In this letter, the presentation of results and the change of variables moves one step further. The square of r(x,0) is re-interpreted once more. With the purpose, perhaps, of making their motivation more persuasive, the authors introduce the latter quantity as a "density of the polar operator" at the very beginning of their text and, not quite comprehensibly, as the main target of their interest.