Title	Solitons and 2 D vortex dynamics
Author(s)	Chow, KW; Lai, DWC; Chan, AT
Citation	The 50th Annual Meeting of the Division of Fluid Dynamics, San Francisco, CA., 23-25 November 1997.
Issued Date	1997
URL	http://hdl.handle.net/10722/57143
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Session Ai - Vortex Dynamics.
ORAL session, Sunday, November 23
309, Moscone Center

[Ai.01] Solitons and 2 D Vortex Dynamics

K.W. Chow (University of Hong Kong), D.W.C. Lai, A.T. Chan

In inviscid, steady, two dimensional flows without body force, one general solution of the equations of motion is ømega = f(\psi), where ømega = vorticity, \psi = stream function, f = a differentiable but otherwise arbitrary function. Recent advances in the theory of solitons and nonlinear waves will be employed to obtain new solutions in vortex dynamics. More precisely, the sine - Gordon and the sinh - Poisson equations will be treated. Known solutions in the literature can be re-derived. Both localized solitons and periodic waves will be utilized. New solutions include for example a doubly periodic array of vortices and a vortex in a box. The new concept of a `positon' will also be examined.

Part A of program listing