PROGRESS OF COMPLEX SYSTEM & SUSTAINABLE DEVELOPMENT

Sino-Russia Social Science & Technoiogy Symposium 2008

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CONTENTS

Numerical Model of Se,orestrocted Vortex Flows With Peninsula-Shaped Boundary

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[illegible] vortex patches and fronts evolu[illegible] most attractive area of study in [illegible] geophysical fluid dynamics. The [illegible] numerical simulation of vortex flows in [illegible] region is under consideration [illegible]. The method of contour dynamics [illegible] model is proposed to simulate [illegible] vortex patches in semirestricted re[illegible]-like boundary. It is shown that [illegible] flow evolution observing the [illegible] in vortex patches boundaries.

[illegible] dynamics, vortex flow, ideal in[illegible] fluid, numerical simulation. Let's [illegible] vortex flow of an ideal incom[illegible] by the domain $D(t)$ of u[illegible] (vortex patch). The flow [illegible] be written in the form

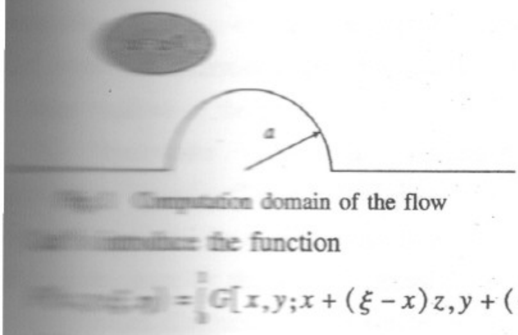
$$[illegible] = \omega_0 \iint_{D(t)} G(x,y;\xi,\eta)\, d\xi d\eta \qquad (1)$$

where (x,y), (ξ,η) are coordinates of observation point and integration point respectively, $G(x,y;\xi,\eta)$ -Green function for the Laplace equation. The velocity vector components u and v may be found from (1) by well known relations

$$u = -\Psi_y, v = \Psi_x. \qquad (2)$$

To construct effective numerical procedure of temporal flow exploration one must rewrite (1) using contour integrating instead of double integrating. In the case of unbounded flow it is easy to make using Green function symmetry with respect to observation and integration points and the Stokes theorem. This paper is dedicated to make contour dynamics algorithm to explore vortex flows in region with peninsula-like boundary (fig. 1). In this case Green function may be written in form where a is the radius of peninsula.

$$[illegible] = \frac{1}{4\pi}\left[\ln\frac{(\xi-x)^2+(\eta-y)^2}{(\xi-x)^2+(\eta+y)^2} - \ln\frac{\left(\frac{a^2\xi}{\xi^2+\eta^2}-x\right)^2+\left(\frac{a^2\eta}{\xi^2+\eta^2}-y\right)^2}{\left(\frac{a^2\xi}{\xi^2+\eta^2}-x\right)^2+\left(\frac{a^2\eta}{\xi^2+\eta^2}+y\right)^2}\right] \qquad (3)$$



[illegible] Computation domain of the flow

[illegible] the function

$$[illegible] = \int_0^1 G[x,y;x+(\xi-x)z, y+(\eta [illegible] \qquad (4)$$

satisfying the identity

$$G = [(\xi-x)F]_\xi + [(\eta-y)F]_\eta \qquad (5)$$

Using (5) and the Stokes theorem one can obtain from (1)

$$\Psi(x,y,t) = \omega_0 \int_{C(t)} F[(\xi-x)d\eta - (\eta-y)d\xi] \qquad (6)$$

where $C(t)$ is the vortex boundary.

Substituting (3) into (4) and integrating it one can find after some algebra where we used the notation