

THE TRANSFORMATION OF OF DISCRETE SINGULARITIES

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The main goal of the report is an application of discrete singularities methods to modeling of the flow with complex geometry of moving boundaries [1-3]. Algorithms that regularize the method of discrete singularities are presented.

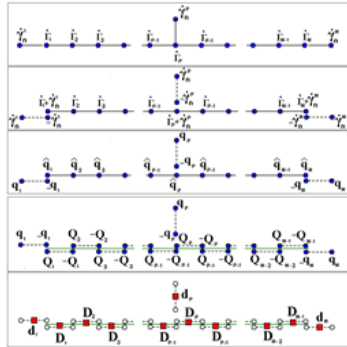


Fig.1

Algorithms of transformation (through single-valued functions) allow us to determine the derivatives of characteristic functions

The conversion algorithm from the vortex to the dipole representation is shown in Fig. 1. Transformation systems discrete vortices to system of discrete singularities higher order allows to obtain the distribution of continuous dynamic system characteristics in the entire region of its borders flow is at any given time.

$$\begin{aligned} \frac{\partial \varphi(x, y, t)}{\partial t} = & \sum_{j=1}^{M-1} (\vec{D}_j \bullet \vec{V}_j(x, y, \bar{x}_j(t), \bar{y}_j(t))) + \sum_p (\vec{d}_p \bullet \vec{V}_p(x, y, \bar{x}_n^p(t), \bar{y}_n^p(t))) - \\ & - \sum_{j=1}^M \Gamma_j(t) (\vec{V}_j(x, y, x_{0j}(t), y_{0j}(t)) \bullet \vec{W}_d(x_{0j}(t), y_{0j}(t))) - \\ & - \sum_{p=1}^P \sum_{i=1}^n \gamma_i^p \left(\vec{V}_i(x, y, x_i^p(t), y_i^p(t)) \bullet \vec{W}_v(x_i^p(t), y_i^p(t)) \right) \end{aligned} \quad (1)$$

References:

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- [2] D.I.Cherniy Proc. XIV International Symposium "Discrete Singularities Methods in Mathematical Physics" 185-187 (2009).
- [3] S.A.Dovgiy, I.K.Lifanov, Naukova dumka, Kiev, (2004).