Geophysical Research Abstracts Vol. 14, EGU2012-1137, 2012 EGU General Assembly 2012 © Author(s) 2011



## Integration of the equations of movement in dead reckoning navigation

## A. Banachowicz (1) and A. Wolski (2)

(1) West Pomeranian University of Technology, Departament of Artificial Intelligence and Applied Mathematics, Szczecin, Poland (abanachowicz@wi.zut.edu.pl, (2) Maritime University of Szczecin, Departament of Marine Navigation, Szczecin, Poland (a.wolski@am.szczecin.pl)

Calculations of position coordinates in dead reckoning navigation essentially comes down to the integration of ship movements assuming an initial condition (position) of the ship. This corresponds to Cauchy's problem. However, in this case the ship's velocity vector as a derivative of its track (trajectory) is not a given function, but comes from navigational measurements performed in discrete time instants. Due to the discrete character of velocity vector or acceleration measurements, ship's movement equations particularly qualify for numerical calculations. In this case the equation nodes are the time instants of measurements and navigational parameter values read out at those instants. This article presents the applications of numerical integration of differential equations (movement) for measurements of velocity vectors and acceleration vector (inertial navigation systems). The considerations are illustrated with navigational measurements recorded during sea trials of the rescue ship integrated system.