

Abstract Submitted
for the DFD09 Meeting of
The American Physical Society

Modeling of Flow and Water Quality Processes with Finite Volume Method due to Spreading and Dispersion of Petrochemical Pollution in the Hydro-Environments EHSAN SARHADI ZADEH, KOUROSH HEJAZI

— Having two water frontiers, namely (everlasting) Persian Gulf and Oman Sea in the south and Caspian Sea in the north, intense dependence on extracting and exporting oil, especially via marine fleets and ever-increasing development of petrochemical industry, Iran is exposed to severe environmental damages caused by oil and petrochemical industries. This essay investigates how oil spill is diffused and its environmental pollution is spread. The movement of oil spill, and its diffusion in water and its effects on water and the environment has been simulated by developing a Depth-Averaged numerical model and using the Finite Volume method. The existing models are not efficient enough to fulfill current modeling needs. The developed model uses the parameters useful in the advection and diffusion of oil pollutions in a model appropriate for predicting the transport of oil spill. Since the Navier-Stokes Equations play an important role in the advection and diffusion of oil pollutions, it is highly important to choose an appropriate numerical method in the advection and diffusion section. In this essay, choosing the methods used in the advection and diffusion have been emphasized and highly-accurate algorithms has been used in the advection terms. These algorithms are not present in similar models. The resulting equations have been solved using the ADI method. This method solves the unknown parameters with solving a Penta-Diagonal matrix in each time step. It does so without sacrificing the desired precision.

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Date submitted: 27 Jul 2009

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