

Mathematical models for ecological prognosis,
design and monitoring
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1. Statements of governmental problems

Theoretical background of joint models of hydrodynamics and pollutant's transport for environmental tasks. Variational formulation of the problems. Classification of the models with respect to scales and goals. Organization of interaction between the models.

2. Transport and transformation of pollutants in the atmosphere

Variational formulation of the transport and transformation problem. Construction of the basic integral identity and conservation laws. Lagrangean and Eulerian models and their combination for forward and inverse problems on the base of variational principle.

3. Environmental prognosis and design

Quality criteria and restrictions; predictability and sensitivity of models. Theoretical and practical approaches. The problem of initial data and parameters. Data assimilation.

4. Optimization for atmospheric quality control

Criteria and limitations of ecological safety. Local and global limitations. Assessment of admissible anthropogenic loads. Method of zoning the areas with respect to levels of anthropogenic impact. Planning of observations. Observability. Numerical models as links between monitoring and observability

5. Some results of environmental case studies