Iterative method of finding hydraulic conductivity characteristics of soil moisture

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Abstract: The work considers the initial boundary value problem for a nonlinear equation of hydraulic conductivity. A method of finding a nonlinear diffusion coefficient was developed and hydraulic conductivity of soil moisture was found. Numerical calculations were conducted.

Keywords: moisture conduction, inverse problem, conjugate problem, difference scheme, diffusion coefficient

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References

[1] E.C. Childs, N. Collis-George, *Proceedings the Royal Society A*, Vol. 201, 392–405 (1950).
[2] S.I. Nerpin, A.F. Chudnovsky, *The soil physics*, M.:Nauka, p.584 (1967).
[3] A.V. Lykov, *Heat and mass transfer*, M.: Energiya, p. 560 (1982).
[4] R.D. Jackson, R.S. Regina e. a., *Soil Science Society of America*, **38**, 861-866 (1984).
[5] A.J. Reynolds, *Turbulent flows in Engineering*, Bruner University, London, p.408 (1974).
[6] F.M. Globus, *Experimental hydro physics of the soil* , L.: Gydrometeoizdat, p.355 (1969).
[7] B. Rysbaiuly, A.T. Baymankulov, *DAN NASc RK*, **3,** 5–8 (2009).
[8] B. Rysbaiuly, A.T. Baymankulov, *International Journal of Academic Research*, **5,** 84–91 (2010).
[9] B. Rysbaiuly, *Wulfenia Journal, Austria*, Vol.20, **12,** 311-335 (2014).
[10] W.R. Gardner , *Highway Research board, Rep*, **40,** 78–87 (1958).
[11] E.A. Fedyaeva, "Mathematical modeling of thermal and moisture transfer in dispersed unsaturated soils", in *Lomonosov Readings, 16-22 April of 2014, Moscow State University, section Engineering and environmental geology.*, M., 2014.
[12] W.G. Gray, C.T. Miller, *Advances in Water Resources*, Vol. 28, 161–180 (2005).
[13] A.A. Rohde, *Fundamentals of soil moisture*, L.:Hydrometeoizdat. Vol. 1 (1985).
[14] B. Blackwell, Charles St Clair Jr., *Ill-posed inverse problems of the heat conductivity.*, M.: Mir, p. 312 (1989).
[15] S.I. Kabanihin, *Inverse and ill-Posed Problems. Theory and Applications.* Degruter, Germany, p. 459 (2011).
[16] A.N. Tikhonov, *Reports of ASc USSR*, vol.39, **5**, 195–198 (1943).
[17] B. Rysbaiuly, *Calculation of thermo physical characteristics of the soil.* in International conference "Advanced Mathematics, Computations & Applications-2014", Akademgorodok, Novosibirsk, Russia, June 8-11 2014, 60.

[18] A.A. Samarsky, *Theory of difference schemes.* M.: Nauka, p. 616 (1983).