

Analysis of non-Newtonian fluids parallel flow between the corrugated plates using the method of fundamental solutions and the radial basis functions

***J.K. Grabski¹ and J.A. Kołodziej¹**

¹Institute of Applied Mechanics, Poznan University of Technology, ul. Jana Pawła II 24, 60-965 Poznań, Poland.

*Corresponding author: jakub.grabski@doctorate.put.poznan.pl

In the paper the analysis of parallel flow between the corrugated plates for selected models of non-Newtonian fluids (namely power-law model, Prandtl-Eyring model and Correau model) was conducted. The nonlinear problem of the parallel flow was solved using the Picard iteration method in which the nonlinear problem is transformed into the sequence of nonhomogenous problems. On each iteration step the solution of nonhomogenous equation consists of the general solution and the particular solution. The right-hand side of the nonhomogenous equation was interpolated using the radial basis functions and the monomials. On this base the particular solution was obtained. The general solution was obtained using the method of fundamental solutions and fulfilling boundary conditions. The results obtained for non-Newtonian fluids were compared with results for Newtonian fluid [1].

Keywords: parallel flow between corrugated plates, non-Newtonian fluids, method of fundamental solutions, radial basis functions

[1] Wang C.-Y., Parallel flow between corrugated plates, *Journal of Engineering Mechanics – ASCE*, vol. 102 (1976), pp. 1088-1090.