Carbon Tetrachloride	0.0000488	0.007578	0.05
Turpentine	0.000085	0.01858	0.001
Acetic Acid	0.0000843	0.1305	0.2
Ethylene Glycol	0.0000999	0.1482	0.1

Table 4. The Input Parameter (iii) for Forced Convention on a flat plate

FLUID	THERMAL DIFFUSIVITY	PRANDTL NUMBER	TIME STEP
Ether	0.0006479	0.004785	0.02
Alcohol Methyl	0.000102	0.006958	0.15
Octane	0.0000751	0.007459	0.01
Alcohol Ethyl	0.0000747	0.0147	0.15
Alcohol Propyl	0.0000849	0.02826	0.05

IV. CONCLUSION

A Convergence condition of forced convection over a flat plate has been successfully modeled, with the random walk method, a version of the vortex element method. From the result obtained, the relationship that the Prandtl number varies with time step was established and that convergence stability can be achieved with suitable time step. The study has also established that the random walk method is a viable numerical tool capable of modelling fluid and heat transfer problems.

REFERENCES

[1]. Wikipedia. 2020. Numerical Analysis. Wikipedia Foundation Inc. Assessed on the 6th of February, 2020 from http://en.wikipedia.org/wiki/Numerical_analysis

[2]. Adegbayo, O.O., Dare, A.A., Olaniyan, A., Olanrele, O.O, Oyedemi, T.I, and Adio, T.I. (2014). Convergence Conditions of Force Convention over a Flat Plate Using Vortex Element Method. International Journal of Fluid Power Engineering, ISSN: 2051-0732, Vol.20, Issue.2, Page: 1154 – 1158. Published by Recent Science Publication.

[3]. Dare, A.A and Petinrin, M.O., 2010. Modelling of natural convection along isothermal plates and in channels using diffusion velocity method. Maejo International Journal of Science and Technology, ISSN 1905-7873, Volume 4, Issue 1 (January - April 2010), PP 43-52.

[4]. Ghoniem, A. F. and Oppenheim, A. K., 1982. Random element method for numerical modeling of diffusional processes, Proc. 8th Int. Conf. Num. Meth Fluid Dynamics, Aachen, Germany (ed. E Krause), Springer-Verlag, New York, pp. 224-232.

[5]. Ogundare, M.A., 2006. Vortex Element Modelling of Fluid and Heat Flow in Vertical Channels and Ducts. PhD. Thesis, 2006, University of Ibadan, Nigeria.

[6]. Chorin, A.J., 1980. Vortex Models and Boundary Layer Instability. Supported in part by the Engineering, Mathematical, and Geosciences Division of the U.S. Department of Energy through the Lawrence Berkeley Laboratory. Published by Society for Industrial and Applied Mathematics. Vol. 1, No. 1.

[7]. Incropera, F. P. and Dewitt D. P., 2005. Fundamentals of Heat and Mass Transfer", 5th Edition, John Wiley & Sons, New York.

[8]. Batchelor, G. K., 1967. An Introduction to Fluid Dynamics", Cambridge University Press, Cambridge.

[9]. Lewis, R. I., 1991. Vortex Element Methods for Fluid Dynamic Analysis of Engineering Systems, University Press, Cambridge.