

## Third Laureate Applied Research



- **Research Work Title:** Thermo - Solutal Convection in a Porous Medium -Filled Enclosure Under Various Thermal and concentration boundary Conditions
- **Researcher:** Prof. Ali J. Chamkha
- **Nationality:** Lebanon
- **Field:** Mechanical Engineering
- **Position:** Professor
- **Scientific Affiliation:** Public Authority for Applied Education & Training, Kuwait

### Abstract:

The above titled research project dealt with laminar thermo-solutal convective flow of a viscous Newtonian fluid in an inclined enclosure filled with a porous medium in the presence of heat generation or absorption effects. Cooperating and opposing transverse gradients of heat and mass were applied on two opposing or adjacent walls of the inclined enclosure while the other two walls were adiabatic and impermeable to mass flux. The proposed problem was formulated in terms of the vorticity-stream function procedure. A numerical solution based on the finite-difference method was obtained. The accuracy of the numerical method was validated by direct comparisons with various special cases of the general problem. Representative results illustrating the effects of the heat generation or absorption coefficient on the contour maps of the streamlines, temperature and concentration as well as the profiles of the velocity components, temperature and concentration at mid-section of the enclosure were reported. In addition, results for the average Nusselt and Sherwood numbers for various parametric conditions were presented and discussed.

### Biography:

Prof. Chamkha is a well known researcher with a very impressive publication record. A review of his publications clearly reveals a high level of innovation and scholarship. He has published extensively (more than three hundred and fifty papers) in high quality international scientific journals in the field of fluid flow and heat and mass transfer in porous media and filtration. Prof. Chamkha's rate of research production is quite impressive considering that he earned his Ph.D. degree in December 1989. His work exhibits excellence and logical reasoning in the field of mechanical engineering. Prof. Chamkha is a reviewer for more than thirty journal and has served on the editorial boards of many scientific journals. Prof. Chamkha has received many previous distinctions in research and quality teaching. He was awarded Khalifa Award for Distinguished University Professor in Scientific Research at the Arab World Level in 2011, Senior Scientist Award, from American Filtration and Separation Society in 2007, Outstanding Teaching Award and Outstanding Research Award in Basic and Applied Sciences at Kuwait University Level in 2001, Young Arab Researcher Award in Engineering Sciences from Abdul-Hamid Shoman Foundation, in Jordan in 1998, Outstanding Teaching Award, Kuwait University in 1997, Achievement Award for Engineering & Technology from Fleetguard, Inc. in 1993 and the Pi Tau Sigma Students' Choice Award for Best ME Professor from Tennessee Technological University in 1991.