

# COMPUTATIONAL THERMAL SCIENCES

## AN INTERNATIONAL JOURNAL

Volume 6 Contents, 2014

### Page Range of Issues

Issue 1: 1–90; Issue 2: 91–190; Issue 3: 191–283; Issue 4: 285–367; Issue 5: 369–460; Issue 6: 461–551

---

### ISSUE 1

---

Numerical Study of Nanofluid Heat Transfer Enhancement with Mixing Thermal Conductivity Models <i>A. Tongkratoke, A. Pramuanjaroenkij, A. Chaengbamrung, &amp; S. Kakaç</i>	1
A Fixed-Grid Based Mixture Model for Pulsed Laser Phase Change Process <i>S.P. Kar &amp; P. Rath</i>	13
MHD Forced Convection Flow of a Nanofluid Adjacent to a Non-Isothermal Wedge <i>A.J. Chamkha &amp; A.M. Rashad</i>	27
Book Review: Rotating Thermal Flows in Natural and Industrial Processes <i>J.A. Reizes</i>	41
Preface: Special Section on Transport Phenomena	45
Thermohydrodynamic Analysis of a Journal Bearing with a Microgroove on the Shaft <i>S. Cupillard, M.J. Cervantes, &amp; S. Glavatskikh</i>	47
The Mathematical Modeling of Thermochemical Process of a Two-Stage Downdraft Gasification <i>K. Jaojaruek</i>	59
Numerical Investigation of Cooling Characteristics for Fine Mist Cooling of High Temperature Material <i>T. Yamamoto, T. Kuwahara, K. Yoshino, K. Nakaso, &amp; T. Yamamoto</i>	69
Heat Transfer in a Viscoelastic Orifice Flow at Low to Moderate Reynolds Numbers <i>T. Tsukahara, T. Kawase, &amp; Y. Kawaguchi</i>	79

---

### ISSUE 2

---

Pseudo-Spectral and Variational Iteration Simulation of Exothermically-Reacting Rivlin-Ericksen Viscoelastic Flow and Heat Transfer in a Rocket Propulsion Duct <i>O.A. Bég, S.S. Motsa, M.N. Islam, &amp; M. Lockwood</i>	91
Radiative Transfer in Vacuum Thermal Insulation of Space Vehicles <i>I.V. Gritsevich, L.A. Dombrovsky, &amp; A.V. Nenarokomov</i>	103
Vorticity Scale and Integral Values of Rayleigh-Benard Convection <i>I. Palymskiy</i>	113
Mixed Convection in a Nanofluid-Filled Vented Rectangular Cavity: Suction and Injection Heat Performance <i>A. Bahlaoui, A. Raji, M. Hasnaoui, &amp; M. Naïmi</i>	129
A New Method to Calculate Conduction Thermal Resistances and Application to Hollow Pipes with Various Cross Sections <i>J. Kerneis</i>	143
Finite Element Analysis of Transient Heat and Mass Transfer in Microstructural Boundary Layer Flow from a Porous Stretching Sheet <i>D. Gupta, L. Kumar, O. Anwar Bég, &amp; B. Singh</i>	155
Comparative Evaluation of the Re-Entrant and Flat Toroidal Combustion Chambers in a Direct Injection Diesel Engine using Computational Fluid Dynamics <i>R. Manimaran &amp; R. Thundil Karuppa Raj</i>	171

---

## ISSUE 3

---

<b>Transient Free-Convection Flow of a Reactive Variable Viscosity Fluid in a Vertical Tube</b> <i>S. Hussnain, A. Mehmood, &amp; A. Ali</i>	<b>191</b>
<b>Numerical Study of Natural Convection Heat Transfer of Nanofluids in Partially Heated Semi-Annuli</b> <i>S. Bezi, A. Campo, N. Ben-Cheikh, &amp; B. Ben-Beya</i>	<b>199</b>
<b>Flow Reversal in Mixed Convection in Vertical Concentric Annuli: Why it occurs in Buoyancy-Aided Flows</b> <i>E.M.A. Mokheimer</i>	<b>219</b>
<b>Wave Propagation in an Inhomogeneous Anisotropic Generalized Thermoelastic Solid Under the Effect of Gravity</b> <i>S. Kumar &amp; P.C. Pal</i>	<b>241</b>
<b>A Discrete Method to Treat Heat Conduction in Compressible Two-Phase Flows</b> <i>F. Petitpas &amp; S. Le Martelot</i>	<b>251</b>
<b>Viscosity and Fluid Suction/Injection Effects on Free Convection Flow from a Vertical Plate in a Porous Medium Saturated with a Pseudoplastic Fluid</b> <i>D. Achemlal, M. Sriti, &amp; M. El Haroui</i>	<b>273</b>

---

## ISSUE 4

---

**SPECIAL ISSUE: UK HEAT TRANSFER CONFERENCE 2013**  
**GUEST EDITORS: CHRISTOS N. MARKIDES & ANDREW L. HEYES**

<b>Effect of Ambient Heat-in-Leaks on a Three-Fluid Cryogenic Heat Exchanger with Two Thermal Communications</b> <i>V. Krishna, S. Spoorthi, P.G. Hegde, &amp; K.N. Seetharamu</i>	<b>285</b>
<b>An Assessment of Working-Fluid Mixtures using SAFT-VR Mie for use in Organic Rankine Cycle Systems for Waste-Heat Recovery</b> <i>O.A. Oyewunmi, A.I. Taleb, A.J. Haslam, &amp; C.N. Markides</i>	<b>301</b>
<b>Numerical Analysis of a Thermally Driven Thermoacoustic Heat Pump for Low-Grade Heat Recovery</b> <i>Z. Yu &amp; A. Al-Kaiyem</i>	<b>317</b>
<b>Thermal Conductivity Enhancement of PCMs for Automotive Thermal Energy Storage Applications: Experimental and Numerical Investigations</b> <i>J. Tissot, M. Lissner, K. Azzouz, &amp; D. Leducq</i>	<b>329</b>
<b>An Experimental and Computational Investigation of a Thermal Storage System Based on a Phase Change Material: Heat Transfer and Performance Characterization</b> <i>A. Gupta, R. Mathie, &amp; C.N. Markides</i>	<b>341</b>
<b>Investigating the Effects of Fuel Flow Rate and Equivalence Ratio on Formation of Soot in Laminar Premixed Flames of C<sub>2</sub> Hydrocarbons using a POD Technique</b> <i>A. Salavati-Zadeh, V. Esfahanian, &amp; H. Akbari</i>	<b>361</b>

---

## ISSUE 5

---

<b>On a Riemann Solver for Three-Dimensional RANS</b> <i>P.V. Chuvakov</i>	<b>369</b>
<b>Numerical Evaluation of Natural Convection Heat Transfer in a Supply-Air Paziad Window</b> <i>A. Amrani, N. Dihmani, S. Amraoui, &amp; A. Mezrhab</i>	<b>383</b>
<b>Mixed Convection Flow of Doubly Stratified Couple Stress Fluid with Heat and Mass Fluxes</b> <i>K. Kaladhar &amp; D. Srinivasacharya</i>	<b>397</b>

<b>Natural Convection Heat Transfer Enhancement in a Square Cavity Filled with Nanofluids and Periodically Heated from the Side</b>	<b>405</b>
<i>M. Hati, A. Raji, M. Hasnaoui, M. Naïmi, &amp; H. El Harfi</i>	
<b>Outflow Boundary Condition for the Unsteady-State Fluid Flow Computation with Variable Density on a Collocated Grid</b>	<b>425</b>
<i>Y. Matsushita, S. Nozawa, T. Katayama, T. Soma, Y. Saito, &amp; H. Aoki</i>	
<b>MHD Transient Nanofluid Flow and Heat Transfer from a Moving Vertical Cylinder with Temperature Oscillation</b>	<b>439</b>
<i>V. Rajesh &amp; O.A. Bég</i>	
<b>Natural Convection Heat Transfer Flow of a Non-Newtonian Second-Grade Fluid Past an Isothermal Sphere</b>	<b>451</b>
<i>R. Bhuvanavijaya, V.R. Prasad, B. Mallikarjuna, &amp; O.A. Bég</i>	

---

## ISSUE 6

---

<b>SPECIAL ISSUE: 14th BRAZILIAN CONGRESS OF THERMAL SCIENCES AND ENGINEERING (ENCIT 2012)</b>	
<b>GUEST EDITORS: LEONARDO S. DE B. ALVES AND LEANDRO A. SPHAIER</b>	
<b>Radial Basis Function Applied to the Solution of MHD Flow in a Tilted Cavity</b>	<b>461</b>
<i>C.R. de Lacerda &amp; M.J. Colaço</i>	
<b>Convection Heat Transfer around a Single Row of Cylinders</b>	<b>477</b>
<i>A.L.F. Lima E. Silva &amp; S.M.M. Lima E. Silva</i>	
<b>Analytical Study of Heat Source-Induced Closure of Penny-Shaped Cracks</b>	<b>493</b>
<i>A.V. Balueva &amp; M. Matczynski</i>	
<b>The Unified Integral Transforms (UNIT) Algorithm with Total and Partial Transformation</b>	<b>507</b>
<i>R.M. Cotta, D.C. Knupp, C.P. Naveira-Cotta, L.A. Sphaier, &amp; J.N.N. Quaresma</i>	
<b>Numerical Analysis of the Fluid-Dynamic Behavior of a Submerged Plate Wave Energy Converter</b>	<b>525</b>
<i>F.M. Seibt, E.C. Couto, P.R. de F. Teixeira, E.D. dos Santos, L.A.O. Rocha, &amp; L.A. Isoldi</i>	
<b>Vortex Method Simulation of Blasius' Flat-Plate Boundary Layer</b>	<b>535</b>
<i>H.C. Santos, V.S. Santiago, &amp; G.C.R. Bodstein</i>	
<b>Reduced Mechanism for Combustion of Hydrogen and Methane with Nitrogen Chemistry</b>	<b>541</b>
<i>P. Azevedo, I. Cabrita, &amp; C. Pinho</i>	

# COMPUTATIONAL THERMAL SCIENCES

AN INTERNATIONAL JOURNAL

## VOLUME 6 AUTHOR INDEX

### Page Range of Issues

**Issue 1: 1-90; Issue 2: 91-190; Issue 3: 191-283; Issue 4: 285-367; Issue 5: 369-460; Issue 6: 461-551**

Achemlal, D., 273	Haslam, A.J., 301	Naveira-Cotta, C.P., 507
Akbari, H., 361	Hasnaoui, M., 129, 405	Nenarokomov, A.V., 103
Ali, A., 191	Hati, M., 405	Nozawa, S., 425
Al-Kayiem, A., 317	Hegde, P.G., 285	Oyewunmi, O.A., 301
Amrani, A., 383	Hussnain, S., 191	Pal, P.C., 241
Amraqui, S., 383	Islam, M.N., 91	Palymskiy, I., 113
Aoki, H., 425	Isoldi, L.A., 525	Petitpas, F., 251
Azevedo, P., 541	Jaojaruek, K., 59	Pinho, C., 541
Azzouz, K., 329	Kakaç, S., 1	Pramuanjaroenkij, A., 1
Bahlaoui, A., 129	Kaladhar, K., 397	Prasad, V.R., 451
Barueva, A.V., 493	Katayama, T., 425	Quaresma, J.N.N., 507
Bég, O.A., 91, 155, 439, 451	Kar, S.P., 13	Rajesh, V., 439
Ben-Beya, B., 199	Kawaguchi, Y., 79	Raji, A., 129, 405
Ben-Cheikh, N., 199	Kawase, T., 79	Rashad, A.M., 27
Bezi, S., 199	Kerneis, J., 143	Rath, P., 13
Bhuvanavijaya, R., 451	Knupp, D.C., 507	Reizes, J.A., 41
Bodstein, G.C.R., 535	Krishna, V., 285	Rocha, L.A.O., 525
Cabrita, I., 541	Kumar, L., 155	Saito, Y., 425
Campo, A., 199	Kumar, S., 241	Salavati-Zadeh, A., 361
Cervantes, M.J., 47	Kuwahara, T., 69	Santiago, V.S., 535
Chaengbamrung, A., 1	Leducq, D., 329	Santos, H.C., 535
Chamkha, A.J., 27	Le Martelot, S., 251	Seetharamu, K.N., 285
Chuvakhov, P.V., 369	Lima E. Silva, A.L.F., 477	Seibt, F.M., 525
Colaço, M.J., 461	Lima E. Silva, S.M.M., 477	Singh, B., 155
Cotta, R.M., 507	Lissner, M., 329	Soma, T., 425
Couto, E.C., 525	Lockwood, M., 91	Sphaier, L.A., 507
Cupillard, S., 47	Mallikarjuna, B., 451	Spoorthi, S., 285
de F. Teixeira, P.R., 525	Manimaran, R., 171	Srinivasacharya, D., 397
de Lacerda, C.R., 461	Markides, C.N., 301, 341	Sriti, M., 273
Dihmani, N., 383	Matczynski, M., 493	Taleb, A.I., 301
Dombrovsky, L.A., 103	Mathie, R., 341	Thundil Karuppa Raj, R., 171
dos Santos, E.D., 525	Matsushita, Y., 425	Tissot, J., 329
El Harfi, H., 405	Mehmood, A., 191	Tongkratoke, A., 1
El Haroui, M., 273	Mezrhab, A., 383	Tsukahara, T., 79
Esfahanian, V., 361	Mokheimer, E.M.A., 219	Yamamoto, Takahisa., 69
Glavatskikh, S., 47	Motsa, S.S., 91	Yamamoto, Tsuyoshi., 69
Gritsevich, I.V., 103	Naiimi, M., 129, 405	Yoshino, K., 69
Gupta, A., 341	Nakaso, K., 69	Yu, Z., 317

# COMPUTATIONAL THERMAL SCIENCES

AN INTERNATIONAL JOURNAL

## VOLUME 6 SUBJECT INDEX

### Page Range of Issues

**Issue 1: 1–90; Issue 2: 91–190; Issue 3: 191–283; Issue 4: 285–367; Issue 5: 369–460; Issue 6: 461–551**

activation energy, 91  
air conditioning, 317  
ambient heat-in-leak, 285  
axisymmetric, 13  
Biot number, 91  
Blasius flat-plate, 535  
boundary condition, 425  
boundary layer, 369, 535  
Boussinesq approach, 113  
buoyancy flows, 219  
Burgers' equation, 507  
butane-decane, 301  
CHEMKIN software, 541  
chemical reaction, 91  
collocated grid, 425  
combustion, 541  
computational fluid dynamics (CFD), 47, 171, 525, 541  
computational model, 103  
conjugated heat transfer, 507  
convection, 113, 477  
convergence, 369  
core-spreading method, 535  
couple stress fluid, 397  
Cu–water nanofluid, 439  
cylinder bank, 477  
diesel engine, 171  
direct-injection, 171  
discrete method, 251  
domestic hot water, 341  
double stratification, 397  
drag reduction, 79  
effectiveness, 285  
eigenvalues, 369  
eigenvectors, 369  
elasticity, 493  
emissions, 171  
exothermic, 91  
experiment uncertainty, 59  
feedstock consumption, 59  
fibrous spacer, 103  
fine mist, 69  
finite element method (FEM), 155, 285

finite volume method (FVM), 383, 425, 525  
fixed-grid, 13  
flow reversal, 219  
fluid mixture, 301  
forced convection, 27  
fracture, 493  
Frank-Kamenetskii parameter, 91  
free-convection flow, 191, 273, 439  
gasification finite computation, 59  
gasifier, 59  
generalized coordinates, 369  
Giesekus model, 79  
grid update, 47  
heat conduction, 143, 251  
heat exchangers, 285  
heat fluxes, 397  
heat recovery, 301, 317  
heat storage, 329  
heat transfer, 1, 59, 79, 113, 155, 199, 405, 451, 477  
high heat flux, 69  
hollow pipes, 143  
hybrid gel propellants, 91  
hybrid methods, 507  
hydrocarbons, 541  
immersed boundary method, 477  
incompressible liquid, 113  
inhomogeneity parameter, 241  
injection, 129  
inner cylinder, 199  
integral transforms, 507  
interface problems, 251  
journal bearing, 47  
Keller box method, 451  
kinetic energy, 113  
laminar flow, 1  
laminar premixed flame, 361  
laser melting, 13  
latent heat, 341  
magnetohydrodynamics (MHD), 37, 439, 461  
mass fluxes, 397  
meshless methods, 461  
microchannel flow, 507  
microgroove motion, 47  
micropolar fluid, 155  
mist cooling, 69  
mixed convection, 129, 219, 397  
mixing model, 1  
mixture, 13  
multipole method, 535  
Nakamura tridiagonal scheme (NTS), 155  
nanofluid, 1, 27, 129, 199, 405  
natural convection, 383, 405  
non-Newtonian fluid, 79, 451  
NOx chemistry, 541  
numerical simulation, 69, 79, 113, 477  
numerical study, 129, 405  
Nusselt number, 155  
organic Rankine cycle (ORC), 301  
orifice, 79  
orthogonal decomposition, 361  
outer cylinder, 199  
oxide film, 103  
packed bed, 59  
performance, 171  
periodic heating, 405  
phase change material, 329, 341  
plane waves, 241  
porous medium, 273  
power generation, 301  
Prandtl number, 113  
pressure variation, 219  
pseudoplastic fluid, 273  
pseudo-spectral method, 91, 113

- radial basis functions, 461  
radiation, 103, 361  
Rayleigh number, 113  
reduced mechanism, 541  
relaxation time, 241  
Reynolds averaged Navier–  
Stokes equations (RANS),  
369  
Riemann problem, 369  
Roe flux scheme, 369  
salt hydrate, 341  
semi-annular enclosure, 199  
shape factor, 143  
Sherwood number, 155  
single-phase model, 1  
solid-liquid interface, 13  
soot, 361  
space vehicle, 103  
stability, 369  
stretching permeable sheet, 155
- submerged plate, 525  
suction, 129  
suction/injection, 273  
supply-air Paziad window,  
383  
temperature pulsations, 113  
thermal conductivity, 329  
thermal effects, 47, 91  
thermal energy storage, 341  
thermal insulation, 103  
thermal resistance, 143  
thermal stresses, 493  
thermal waves, 241  
thermoacoustic cooler, 317  
thermoacoustic engine, 317  
thermophoresis, 27  
Three Dimensional (3D), 369  
Toms effect, 79  
toroidal combustion chamber,  
171
- transient flow, 13, 191, 439  
turbulence, 79, 369  
two-phase flow, 251  
unsteady flow, 155  
unsteady state, 425  
variational iteration method, 91  
vented cavity, 129  
vertical annuli, 219  
vertical tube, 191  
viscoelasticity, 79, 91  
viscoelastic flow, 91, 113  
viscosity, 191  
viscous fluid, 191  
viscous heating, 91  
volume of fluid (VOF), 525  
vortex method, 535  
waste heat, 301  
wave energy converter, 525  
wedge, 27  
working fluid, 301