This Sample of a Full Paper for the IAES 2024 Proceedings was Prepared using LaTeX

Author A[1], Author B[2], Author C[3*], and Author D[1]

[1]Department of Aerospace Engineering, IIST, Thiruvananthapuram-695547, India
[2] Centre for High Energy Physics, IISc, Bengaluru-560012, India
[3] Planetary Sciences Division, PRL, Ahmedabad-380009, India

*Corresponding author: author.c@prl.res.in

ABSTRACT

Write your abstract here. Limit the abstract to 200 words. This will contain a brief introduction to the paper, and a summary of the salient results and conclusions.

Keywords: Insert 3-4 keywords, separated by comma, that categorize your work

NOMENCLATURE

A	Frontal area of rotor	[m^2]
Re	Reynolds number	–
ϵ	Dissipation	–

1. INTRODUCTION

Write your introduction section here in 10 point Times New Roman. The introduction part should give the necessary background / motivation behind the work. The citations of others' work may be bracketed [1, 3] appropriately [4].

2. LITERATURE REVIEW AND OBJECTIVE

This subsection should contain the literature review and the objective of the work undertaken Write text matter here in. Necessary citations may be bracketed [3–7] appropriately.

3. MATERIALS AND METHODOLOGY

Write your texts here. This part should contain the necessary matters related to computational, experimental and analytical investigations. All Figures / Tables are to be cited within the texts. The Figure/Table captions must be written as indicated here. The Figure caption should appear at the bottom of the Figure, while the Table caption should appear on top of the Table. This is the standard practice.

$$\frac{\partial u_i}{\partial x_i} = 0 \tag{1}$$

$$\frac{\partial u_i}{\partial t} + \frac{\partial (u_i u_j)}{\partial x_j} = -\frac{\partial p}{\partial x_i} + \sqrt{\frac{Pr}{Ra}}\frac{\partial^2 u_i}{\partial x_j \partial x_j} + \delta_{iy}\theta \tag{2}$$

$$\frac{\partial \theta}{\partial t} + \frac{\partial (u_j \theta)}{\partial x_j} = \sqrt{\frac{1}{RaPr}}\frac{\partial^2 \theta}{\partial x_j \partial x_j} \tag{3}$$

where, $x_i (i = 1, 2, 3)$ represent the spatial coordinates (x, y, z) with y being the vertical direction, $u_i(u, v, w)$ are the velocity components, p the pressure and θ the normalized temperature $(\theta = (T - T_C)/(T_H - T_C))$ with T is the instantaneous temperature and T_H, T_C are, respectively, the temperature of the hot and cold plates. We have used H, $\sqrt{g\alpha\Delta TH}$ and $(T_H - T_C)$ as the scales for normalization of length, velocity and temperature, respectively. Equations 1-3 are discretized using finite volume framework. The
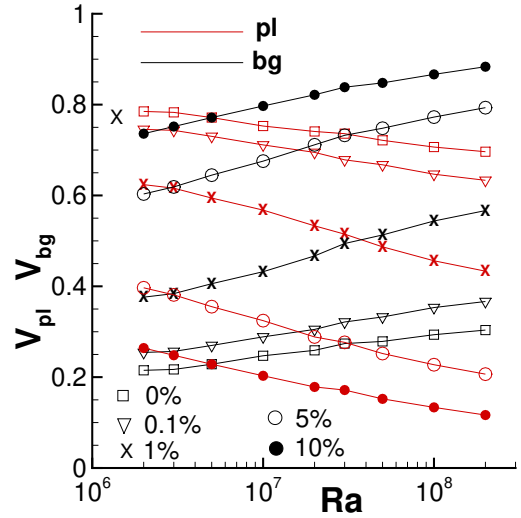
Figure 1: **Variations of the percentage volume occupied by the plume and the background in the cubic cell with** Ra **for different threshold value** δ**.**

same could be written as finite volume framework is used to discretize Eqs. 1-3. No-slip condition is implemented for all the velocity components on the walls, while for temperature, isothermal condition is applied on the horizontal walls and no-flux (adiabatic) conditions is applied on the vertical walls. Hence, at the top and bottom solid walls, the temperature takes specified values (0 and 1).

3.1. Validation

The simulation details are given in the Table 1. To validate our code we computed the Nusselt numbers through three different ways [3]: (a) using the mean heat flux at the horizontal surfaces near the hot and bottom plates (Nu_S), (b) using the heat dissipation $(Nu_{\epsilon_T} = (RaPr)^{1/2} < \epsilon_T >_{global})$, and (c) using the viscous dissipation $(Nu_{\epsilon_u} = (RaPr)^{1/2} < \epsilon_u >_{global} +1)$.

Table 1: **The values of the fitting parameters**

$\delta(\%)$	A_{pl}	β_{pl}	A_{bg}	β_{bg}
0	0.138	-0.197	0.553	-0.269
0.1	0.115	-0.198	0.838	-0.279
1	0.072	-0.182	0.919	-0.287
5	0.033	-0.144	0.531	-0.265
10	0.02	-0.118	0.377	-0.248
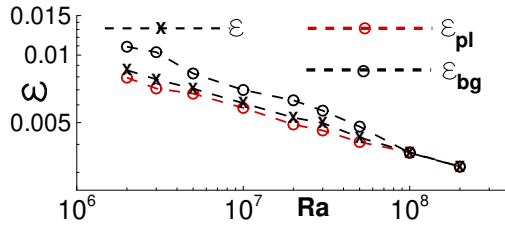
Figure 2: **Variations of the contribution of the plumes and the background to the heat dissipation rates with the Rayleigh number.**

4. RESULTS AND DISCUSSION

All the figures and Tables should be referred in order of their appearances. Figure 1 should be written if it appears at the start of a sentence, while Fig. 1 is the correct way otherwise. However, Table 1 should appear in full irrespective of its position. The validation were presented in Sec. 3.1.

Discussion of the results is to be written here. All Figures are to be cited within the text. Results obtained may be compared with the published data wherever applicable/possible through necessary citations in bracketed form [2, 5].

In RBC one of the central theme of the turbulent research is to get the scalings for the dissipation rates and further establish its connection with the nature of heat transport in the turbulent state [4]. A plume can be defined in the region where there is strong correlation between the vertical velocity (w) and the temperature fluctuations defined as $\theta(\mathbf{x}, t) = T(\mathbf{x}, t) - \langle T(z) \rangle_{A,t}$ where, $< . >_{A,t}$ is the averaged over horizontal plane and the time, exists.

All the references that appear in the section "REFERENCES" should be cited appropriately in the text.

5. CONCLUSIONS

The key findings of the work are to be placed here. The conclusion part should be qualitative and quantitative.

REFERENCES

[1] S. Gsell, R. Bourguet, and M. Braza, *Vortex-induced vibrations of a cylinder in planar shear flow.*, J. Fluid Mech. **825** (2017), 353–384.

[2] Aradhna Krishna, *An integrative review of sensory marketing: Engaging the senses to affect perception, judgment and behavior*, Journal of consumer psychology **22** (2012), no. 3, 332–351.

[3] R. L. Panton, *Incompressible flow*, Wiley, 2009.

[4] H. Pascal, S. Jakirlic, and K. Hanjalic, *DNS and RANS-Modelling of In-cylinder Turbulence subjected to Axial Compression*, 3rd International Symposium on Turbulence, Heat and Mass Transfer, 2000.

[5] Ramprasad Prasanna, Prakash Moorthy, Aravind Krishnan, and Venkatesh Balakrishnan, *Analysis and optimization of radiant cooling panel with wave-type embedded pipes*, Engineering Transactions **68** (2020), no. 1, 47–67.

[6] Rishi Raj, Shalabh C Maroo, and Evelyn N Wang, *Wettability of graphene*, Nano letters **13** (2013), no. 4, 1509–1515.

[7] Siddharth Suman, Mohd Kaleem Khan, and Manabendra Pathak, *Performance enhancement of solar collectorsâ€"a review*, Renewable and Sustainable Energy Reviews **49** (2015), 192–210.

Notes to Author(s)

- The full paper is restricted to a maximum of 6 pages.
- In each section, sub-sectioning if required, can be done appropriately.
- The full paper manuscript filename should be "IAES-2024-Paper ID"
- Once the paper is compiled, remove all the instructions, if any, in this template.
- Please remove this "Notes to Author(s)" in the submission.