

Report on research collaboration

between

Dr. Shuvam Sen, Department of Mathematical Sciences, Tezpur University

and

**Dr. Tony W. H. Sheu, Taida Institute of of Mathematical Sciences, National Taiwan University,
Taipei**

Title of collaboration:

On the Development of a Nonprimitive Navier-Stokes Formulation Subject to Rigorous Implementation of a New Vorticity Integral Condition

Summary of collaboration:

A collaborative research work was undertaken by Dr. Shuvam Sen and Dr. Tony W. H. Sheu with the aim to develop and implement vorticity integral boundary condition for nonprimitive Navier-Stokes formulation. The main emphasis was on the realization of global integral vorticity condition as explicit boundary vorticity condition and to develop an algorithm which is easy to implement and versatile. On the analytical side the challenge was to establish convergence analysis of this alternative vorticity condition hitherto developed. From computational view point it was important to document competency of this algorithm vis-à-vis existing boundary procedures. Expertise and computational resources from both the collaborators were put together to come up with detailed analysis along with computational evidence were put forward. The collaboration started with the visit of Dr. Sen to NTU in the year 2013 for a period of one month on the invitation of Dr. Sheu and was thereafter mostly restricted in online mode with exchange of ideas and data over electronic mode of communication.

Duration of collaboration:

The collaboration started in the month **January, 2013** and culminated in the form of a published research paper in the month of **June, 2017**.

Details of collaboration:

Details of collaboration could be found in the article-

On the development of a nonprimitive Navier-Stokes formulation subject to a rigorous implementation of vorticity integral condition, Journal of Scientific Computing, vol. 72, p. 252-290, **2017**.

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