

Travel and Research Exchange Report

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Host Institution: Kyushu University, Japan

Host Professor: Prof. Yasuhide Fukumoto

1. Academic Exchange and Research Highlights

My visit to Kyushu University has been an incredibly rewarding experience. Under the generous hosting and profound guidance of Prof. Yasuhide Fukumoto, our collaborative research made significant progress. During this visit, we focused on estimating the pressures and forces on wings in hypersonic flow.

Key Breakthroughs:

- **Bridging Theory and Engineering:** Successfully bridged the gap between abstract mathematical theories and practical aerodynamic engineering.
- **Coherent Framework:** By putting the Radon measure solutions (for infinitely thin shock layers) and the classical characteristics methods (for expansion waves) into a coherent framework, we established a remarkable consistency between mathematical theoretical solutions and engineering solutions.
- **Physical Significance:** This realization not only provided a solid, meaningful physical background for the mathematical problems I have been studying but also clarified how to derive the global lift and drag forces acting on hypersonic vehicles.

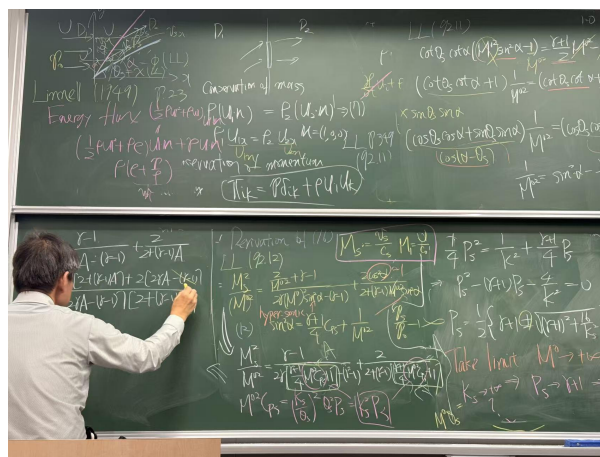


Figure 1: Deep in an inspiring discussion over mathematical formulations on the blackboard at Kyushu University.

2. Cultural Experience and Academic Environment

Beyond the academic achievements, experiencing the distinct and rigorous academic environment at Kyushu University was truly inspiring. I was deeply impressed by the dedication, open-mindedness, and collaborative spirit of the researchers and students there. Through our daily discussions and interactions, I have built wonderful friendships and professional relationships that I am confident will last a lifetime.

Moreover, my visit coincided with the Japanese New Year. It was a magnificent experience to immerse myself in the rich traditional culture and feel the strong, warm festive atmosphere of the local community. Celebrating this special time in Japan added an unforgettable and beautiful layer of cultural appreciation to my academic journey.



Figure 2: Visiting Dazaifu during the Japanese New Year to experience the rich traditional culture and the warm festive atmosphere.

3. Acknowledgments

I would like to express my deepest and most sincere gratitude to Prof. Fukumoto for his invaluable mentorship, hospitality, and the countless hours he spent discussing fluid dynamics and mathematics with me.

I am also immensely grateful to the Program Committee and the Organizing Committee for their continuous attention and steadfast support for the "Math for Industry" initiative. It is exactly because of your vision and generous support that young researchers like myself are given these precious opportunities to broaden our horizons, collaborate internationally, and apply mathematical theories to real-world engineering challenges.

This journey has been a milestone in my early academic career, and I look forward to continuing this fruitful collaboration in the future.