Report on DLR-Tohoku University Joint Workshop

"Multi-Disciplinary /
Multi-Objective Optimisation"

February 23rd, 2011

Building 106, Hermann-Blenk-Saal, DLR, Braunschweig, Germany

The international workshop "*Multi-Disciplinary / Mult-Objective Optimisation*" was held on February 23rd in Braunschweig, jointly organized and supported by German Aerospace Center (DLR) and Global COE program, *World Center of Education and Research for Trans-disciplinary Flow Dynamics*. The aim of the workshop was to discuss various cutting edge Multi-Disciplinary and Multi-Objective Design Optimization techniques based on high-fidelity methods. This was held as one of activities of International Joint Laboratory "*Development of Design Exploration Method for Real-World Design Problem by International Collaborations*".

In the previous two Global COE workshops "*Multi- Objective Design Exploration*" and "*International Workshop on Machine Learning for Aerospace*", fundamental techniques for aerospace design problems were mainly discussed. The present workshop was therefore more concentrated on aerospace application. Thus, the bottlenecks of the usage of Multidisciplinary Design Optimization (MDO) and Multi-Objective Optimization, and the required research fields to facilitate technology development in aerospace design problems are discussed among the participants from universities, research institutes and industries. There were 53 participants from more than 5 foreign countries and 4 from Japan. There were 12 invited talks (industry: 3, university: 3, and research institutes: 6).

The first session had 3 presentations from aircraft and automotive companies (Airbus, Mitsubishi Aircraft Corporation, Honda). They talked about the various real applications and approaches. Dr. Markus Olhofer (Honda Research Institute) proposed very unique techniques for robust design. The second session was university, and Prof. Volker Schulz (University of Trier) presented the cutting-edge techniques of shape optimization for aerospace application. The third and fourth session was research institute session. Six representatives from European major aerospace institutes presented their latest techniques and approaches for various aerospace design problems. Dr.

Joel Brezillon (German Aerospace Center, DLR) showed various DLR's MDO techniques. Dr. Domenico Quagliarella (Italian Aerospace Research Center, CIRA) presented various design tools for different aerospace applications. Dr. Jean-Antoine Désidéri (French National Establishment for Research in Computer Science and Applied Mathematics, INRIA) presented their unique idea to solve two-criteria optimization problems. Through all the presentations, a lot of enthusiastic and useful discussion over the design optimization techniques was conducted.

The present workshop provided the opportunity to share the idea of various optimization approaches for real-world aerospace applications. Now MDO problem is emerging and challenging topic in aerospace field as it has a potential to improve reliability of aircraft design. This workshop must have been useful for all the participants to understand the current issues and potentials to tackle for future real-world aerospace MDO problems.

Picture 1: After the workshop