Requests for Collaboration

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Research Interests

- Computational Design
- Architectural Planning
- Computational Geometry

Creative Achievements in The Application of New and Existing Science and Technology

My main research themes are "Development of form design method based on combinatorial rigidity theory" (e.g. [1], [3], [4], [5]) and "Research on deployable and foldable structure" (e.g. [2], [4]). I am working on the development of form design method based on combinatorial rigidity theory, which is the theory of determining rigidity by the connection relationship of components. In combinatorial rigidity theory combinatorial characterization of various structures has been studied. There is a structure called a panel-hinge framework which is like origami. Based on combinatorial rigidity theory and geometry, I am working on the deployable and foldable structures.

Technology (Product, Process, Device, Service etc.) That I Want to Request for Collaboration

- Development of control device for deployable and foldable structure
- Structural calculation by numerical analysis

A List of 5 Key Publications

[1] Generation Methods of Rigid Bar-Joint Frameworks of Union of Space-Filling Convex Polyhedra and Application to Design Form, Y. Kobayashi and N. Katoh, ***Journal of Environmental Engineering*, 83**(745), 323-331(in Japanese) (2018).
[2] Continuous Flattening of Regular Dodecahedron, T. Horiyama, J. Itoh, N. Katoh, Y. Kobayashi, and C. Nara, ***The 18th Japan Conference on Discrete and Computational Geometry and Graphs***, Revised Selected Papers, 120–131 (2016).
[3] Characterizing Redundant Rigidity and Redundant Global Rigidity of Body-Hinge Graphs, Y. Kobayashi, Y. Higashikawa, N. Katoh, and A. Sljoka, ***Information Processing Letters***, **116**(2), 175–178, (2016).
[4] An Inductive Construction of Rigid Panel-Hinge Graphs and Their Applications to Form Design, Y. Kobayashi, N. Katoh, T. Okano, and A. Takizawa, ***The International Journal of Architectural Computing***, **13**(1), 45–63, (2015)
[5] An Inductive Construction of Minimally Rigid Body-Hinge Simple Graphs, Y. Kobayashi, Y. Higashikawa, N. Katoh, and N. Kamiyama, ***Theoretical Computer Science***, 556:2–12, (2014).