Design of Automatic Retractable Dome Structure Using Petal Arrangement Patterns

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Flowers have evolved into a way to reduce energy waste through long evolutionary process. We began our research with the inspiration from the features of flower's blooming. The ideas obtained from flower blooming were applied to the opening and closing of the dome structure to produce a dome structure which uses energy efficiently. To achieve the goal, we mathematically analyzed the flowers blooming patterns and applied it to dome structure through computer programs. By these efforts, unlike the existing dome structure, we were able to create a dome structure that can be automatically opened and closed according to the climate change. In order to build up a dome structure, we studied various flowers that can be seen from the surrounding area, and we chose rose of sharon as the most efficient plant in terms of energy consumption. Through this research, we are proposing an energy-efficient, artistic dome structure that reacts according to climate change. In addition, we expect to add convenience to the already constructed roofless dome structure by adding roofs at low cost.

Awards Won: