

- We illustrate a small instance's core and nucleolus relationship with $|N|=10$, $|M|=3$, and $|B_m|=3$. In this case, the cost of grand coalition is $C(\{1,2,3\})=3243$, and the stand-alone cost of each terminal is $C(\{1\}) = 939$, $C(\{2\})$, and $C(\{3\}) = 1693$. **Figure 5.4** presents the individual cost of each terminal by two different cost allocation methods. We use Barycentric coordinates to illustrate the cost allocation in **Figure 5.5**, where the vertex is defined as the maximum cost (stand-alone cost) each terminal can accept, and each point inside the triangle represents a cost allocation. The definition of the core maps a stable area in which there is no incentive for terminals to leave the grand coalition.
- To show the effectiveness of the proposed HCBAP model in dealing with disruptions, we compare extra costs after disruptions, with and without collaboration in **Figure 5.6**.
- In **Figure 5.7**, we illustrate the great deviation of the cost allocation obtained by the PSC compared with the proposed RG-based core and the nucleolus for individual terminals in the coalition.
- **Figure 5.8** Analyses of individual cost savings for instances with different vessel size.
- **Figure 5.9 shows** the difference between Max and Min of RG-based core and the nucleolus.