A Cut Approach for Solving the Single-Row Machine Layout Problem

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Abstract

A cut approach is developed for the machine configuration in a single-row linear layout, with objective to minimize the total material movement cost. We show that the above equidistant linear layout problem is equivalent to the locale network problem by graph theory. The minimum cut, which has the minimum capacity in each locale network, is the corresponding optimal layout that minimizes the material handling cost. The computational complexity of the cut approach is \( O(n^3) \), where \( n \) is the number of workstations in the layout problem. In addition, the non-equidistant linear layout problem can be transformed into an equidistant linear layout problem; and then solved with the extended approach.