ENGSCI 760: Heuristics Assignment - Ship Balancing

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Question 1: Objective Function

$$f(\mathbf{s}) = \frac{|\sum_{i=1}^{n} 5w_i x_i| + |\sum_{j=1}^{n} w_j y_j|}{\sum_{k=1}^{n} w_k}$$

Question 2: Neighborhood Rule

let

$$\mathbf{s} = (s_1, s_2, ..., s_a, ..., s_b, ..., s_n)$$

then

$$\mathbf{t}(\mathbf{s}, a, b) = (s_1, s_2, ..., s_b, ..., s_a, ..., s_n)$$

Question 3: Zero Swap Case

A swap of container i with $s_b = 0$ corresponds with moving container i into empty space b.

Question 4: Equivalent Solutions

swap with container i + 60
swap 2 empty spaces

Question 5: Distinct Solutions

$$N(\mathbf{s}) = \{\mathbf{t}(\mathbf{s}, a, b) | a + 60 \neq b; a < b, \forall a, b < 120; w(s_a) + w(s_b) \neq 0)\}$$