Metaheuristics Project

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1 Large Neighborhood Search

Algorithm 1 Pseudocode for the Large-Neighborhood Search

function LNS($s^*, t,$ config)
  $s_{\text{best}} \leftarrow s^*$
  $n \leftarrow 0$ ▷ Numer of iterations with no change
  while $n \leq 100 \land t_{\text{run}} < t$ **do** ▷ Do not exceed time limit
    $s_{\text{destroyed}} \leftarrow \textsc{Destroy}(s^*)$
    $s_{\text{repair}} \leftarrow \textsc{Repair}(s_{\text{destroyed}})$
    if $s_{\text{repair}} > s_{\text{best}}$ **then**
      $s_{\text{best}} \leftarrow s_{\text{repair}}$
      $n \leftarrow 0$
    else
      $n \leftarrow n + 1$ ▷ If the solution is not better, increase n
    end if
  end while
end function

Algorithm 2 Pseudocode for the Destroy Operators

function $\textsc{Destroy}(s^*)$
  $o \leftarrow$ randomly choose destroy operator
  if $o = 1$ **then**
    weeks, ganes $\leftarrow$ Randomly destroy 2 or 3 weeks ▷ Use uniform distribution
  else if $o = 1$ **then**
    weeks, ganes $\leftarrow$ Destroy the 2 or 3 worst weeks
  end ifreturn weeks, games
end function

Algorithm 3 Pseudocode for the Repair Operators

```
1: function Repair(s*, n, weeks, games, t)
2:     if n > 6 ∧ |weeks| > 2 then
3:         o ← randomly choose repair operator\{1}          ▷ Use uniform distribution
4:     else
5:         o ← randomly choose repair operator              ▷ Use uniform distribution
6:     end if
7:     if t > 25 then
8:         o ← randomly choose repair operator\{1, 2}       ▷ Use uniform distribution
9:     end if
10:    if o = 1 then
11:        for week ∈ weeks do
12:            week_new ← RandomInsertion(s*, games, week, n, t)
13:        end for
14:        weeks, ganes ← Destroy the 2 or 3 worst weeks
15:    else if o = 2 then
16:        for week ∈ weeks do
17:            week_new ← InsertGameMaxProfitWeek(s*, games, week, n, t)
18:        end for
19:        weeks, ganes ← Destroy the 2 or 3 worst weeks
20:    end ifreturn weeks, games
21: end function
```

Algorithm 4 Pseudocode for random-insertion

```
1: function RandomInsertion(s*, games, week, n, t)
2:     if n > 6 ∧ |weeks| > 2 then
3:         o ← randomly choose repair operator\{1}          ▷ Use uniform distribution
4:     else
5:         o ← randomly choose repair operator              ▷ Use uniform distribution
6:     end if
7:     if t > 25 then
8:         o ← randomly choose repair operator\{1, 2}       ▷ Use uniform distribution
9:     end if
10:    if o = 1 then
11:        weeks, ganes ← Randomly destroy 2 or 3 weeks
12:    else if o = 1 then
13:        weeks, ganes ← Destroy the 2 or 3 worst weeks
14:    end ifreturn weeks, games
15: end function
```

Algorithm 5 Pseudocode for inserting the game with max-profit

```
1: function InsertGameMaxProfitWeek(s*, games, week, n, t)
2:     if n > 6 ∧ |weeks| > 2 then
3:         o ← randomly choose repair operator\{1}          ▷ Use uniform distribution
4:     else
5:         o ← randomly choose repair operator              ▷ Use uniform distribution
6:     end if
7:     if t > 25 then
8:         o ← randomly choose repair operator\{1, 2}       ▷ Use uniform distribution
9:     end if
10:    if o = 1 then
11:        weeks, ganes ← Randomly destroy 2 or 3 weeks
12:    else if o = 1 then
13:        weeks, ganes ← Destroy the 2 or 3 worst weeks
14:    end ifreturn weeks, games
15: end function
```