**Notations**

Deterministic – All the environment is known in advance.

Stochastic - Stochastic tasks arrival.

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| **Article** | **Problem characteristics** | **Comp.** | **Methodology** | **Problem Closeness**  **(10 – Similar problem,**  **100 – Not similar)** |
| A multiprocessor task scheduling model for berth allocation:  heuristic and worst-case analysis.  Yongpei Guana, 2002 | Processors: M.  Tasks: pj,sizej, must run on consecutive processors  Optimality Criteria: | NP-Hard | Heuristic – order jobs in increasing order of pj and sj. | 10 |
| A tabu search algorithm for a two-dimensional non-guillotine cutting problem (R. Alvarez-Valdes, 2007) | 2D-SLOPP (two-dimensional single large object placement problem) |  | Tabu search heuristic | 10 |
| The berth allocation problem: models and solution methods. Yongpei Guan, 2004. | Problem Category: BAPC  Processors: M  Task: pj,sizej,aj (arrival time), wj (weight)  Optimality Criteria: |  | Lower Bound through Lagrangian relaxation. Tree search procedure.  Some heuristics evaluation. | 10 |
| Berth allocation in a container port using a continuous location space approach (Akio Imai, 2004) | BAPC (Cutting stock similarity)  Processors: M  Tasks: pjm  Optimality Criteria: |  |  | 10 |
| The continuous Berth Allocation Problem A Greedy Randomized Adaptive Search Solution (Der-Horng Lee, 2010) | BAPC |  | Greedy randomized search | 10 |
| Berth scheduling by simulated annealing (Kap Hwan Kim, 2003) | BAPC |  | Simulated annealing | 10 |
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| General Multiprocessor Task Scheduling. Jianer Chen 1998. | Processors: 2  Tasks: setj, (pi1,pi2,p12 process time on different processors set)  Optimality Criteria: Cmax | NP-Hard | Dynamic programming, optimal algorithm in O(nT). | 100 |
| Processors: 3  Tasks: setj, (pi1,pi2,p12 process time on different processors set)  Optimality Criteria: Cmax | NP-Hard | Dynamic programming, proof for: | 100 |
| Processors: M  Tasks: setj, (pi1,pi2,p12 process time on different processors set)  Optimality Criteria: Cmax | NP-Hard | Dynamic programming, Proof for: | 100 |
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| Scheduling multiprocessor tasks on three dedicated processors | Processors: 3  Task: pj{m}, setj  Optimality Criteria: Cmax | NP-Hard  Reduction to 3-Partition problem |  | 100 |
| The simultaneous berth and quay crane allocation problem | For berth allocation  (a) Each berth can serve one ship at a time.  (b) There are no physical or technical restrictions such as ship draft and water depth.  (c) Ship handling time is dependent on the berth where it is assigned.  (d) Ship is served after its arrival.  (e) Ship handling tasks must be finished without interruption once they get started.  For crane scheduling, the following assumptions are made:  (f) Ship handling requires a specific number of cranes and it does not begin till that number of cranes are available.  (g) Cranes cannot move from one berth to another via other berths if the other berths are engaged in ship handling.  (h) Cranes get through an idle berth having some cranes present by the pushing-in and pulling-out procedure. |  | Genetic algorithm | 100 |
| A genetic algorithm for minimizing the makespan in the case of scheduling identical parallel machines | Processors: M  Tasks: pj, sizej=1  Optimality Criteria: cmax |  | Genetic Algorithm, Simulated annealing method | 100 |
| A graph coloring approach to scheduling of multiprocessor tasks on dedicated machines with availability constraints | Processors: M,  Tasks: pj=1, setj, win(task has time window when it is available)  Optimality Criteria: Minimal execution cost, where cost depends on task scheduled time. | NP-Complete (with proof) | Graph coloring, Hypergraphs properties. | 100 |
| Scheduling on identical parallel machines to minimize total completion time with deadline and machine eligibility constraints | Processors M  Tasks: pj, setj (with partial eligible machines, for each task).  Optimality Criteria: | NP-Hard | Hueristic for solving the problem. Proposed lower bound for base on the dual problem.  Branch and bound algorithm. | 100 |
| Efficient Planning of Berth Allocation for Container Terminals in Asia | Classical BAP Problem - Allocation of vessels to berths, like unrelated parallel machines.  Processors: M (Rm)  Tasks: pjm  Optimality Criteria: Minimize vessel time in the system, and minimize vessel dissatisfaction. |  |  | 100 |
| Berthing ships at a multi-user container terminal with a limited quay capacity (Akio Imai, 2006) | BAP with External terminal SBAPE (S – static, E – external) and DBAPE (D – dynamic).  Processors: M  Tasks: pjm  Optimality Criteria: |  |  | 100 |
| An optimization heuristic for the berth scheduling problem (Yusin Lee, 2008) | Multiple BAPC |  |  | 100 |
| The simultaneous berth and quay crane allocation problem (Akio Imai, 2007) | B&CAP problem/ Simultaneous BAP and CAP problem solved |  |  | 100 |
| Integrating berth allocation and quay crane assignments (Daofang Chang, 2010) | C&BAP |  | Genetic Algorithm | 100 |
| Models for the discrete berth allocation problem A computational comparison (Katja, 2010) | BAPD |  |  |  |
| Quay Crane Scheduling at Container Terminals To Minimize the Maximum Relative Tardiness of Vessel Departures (Jiyin Liu, 2005) | QCSP |  | Specific two level heuristic | 100 |
| A Dynamic Berth Allocation Model Based on Stochastic Consideration (Pengfei, 2006) | Stochastic BAPD |  | Genetic Algorithm | 100 |
| The Berth Allocation Problem with Service Time and Delay Time Objectives (Akio Imai, 2007) | Multi Objective BAPD |  | Genetic algorithm | 100 |
| A particle swarm optimization algorithm for hybrid flow-shop scheduling with multiprocessor tasks (CHAO-TANG TSENG, 2008) | Hybrid Flow Shop |  | Particle swarm optimization | 500 |
| A simulated annealing for hybrid flow shop scheduling with multiprocessor tasks to minimize makespan (Hui Mei Wang, 2011) | Hybrid Flow Shop |  | Simulated Anealing | 500 |
| Rescheduling of identical parallel machines under machine eligibility constraints | Deterministic.  Processors: M  Tasks: |  | Genetic algorithm | 100 |
| Exact performance of MULTIFIT for nonsimultaneous machines. Hark-Chin Hwang April 2014 | Processors: M, sm – machine starting time.  Task characteristics: pj,sizej=1  Optimality Criteria: Cmax | NP-Complete | Worst case analysis of MULTIFIT | 100 |