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| **Example** | **Type** | **Status** |
| *Blending Problem* | LP | Done |

**Description**

Minimization of the price of an alloy produced from other alloys available on the market.

**Location:** \Chemical Engineering\BlendingProblem

**Page:** Yes

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| **Example** | **Type** | **Status** |
| *Chemical Equilibrium* | NLP | Done |

**Description**

Determination of the chemical composition of a complex mixture under chemical equilibrium conditions.

**Location:** \Chemical Engineering\ChemicalEquilibrium

**Page:** Yes

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| **Example** | **Type** | **Status** |
| *Oil Pipeline Design* | MIP | Done |

**Description**

We consider a given set of offshore platforms and onshore wells producing known amounts of oil to be connected to a port. Connections may take place directly between platforms, well sites, and the ports, or may go through connection points at given locations. The configuration of the network and sizes of pipes used must be chosen to minimize construction costs.

**Location:** \Energy\OilPipelineDesign

**Page:** Yes

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| **Example** | **Type** | **Status** |
| *Goddard Rocket* | NLP | Done |

**Description**

Maximization of the final altitude of a vertically launched rocket, using the thrust as a control and given the initial mass, the fuel mass, and the drag characteristics of the rocket.

**Location:** \Engineering\GoddardRocket

**Page:** Yes

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| **Example** | **Type** | **Status** |
| *Hanging Chain* | NLP | Done |

**Description**

Determination of the shape of a chain suspended between two points with minimal potential energy.

**Location:** \Engineering\HangingChain

**Page:** Yes

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| **Example** | **Type** | **Status** |
| *Largest Small Polygon* | NLP | Done |

**Description**

Determination of the polygon with maximal area, among polygons with n sides and diameter d ≤ 1.

**Location:** \Engineering\LargestSmallPolygon

**Page:** Yes

**Notes:** Problem could be used to demonstrate multi-start as it has many local minima.

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| **Example** | **Type** | **Status** |
| *Robot Arm* | NLP | Done |

**Description**

Minimization of the time taken for a robot arm to travel between two points.

**Location:** \Engineering\RobotArm

**Page:** Yes

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| **Example** | **Type** | **Status** |
| *Structural Optimization* | NLP | Done (but some data is unknown/uncertain) |

**Description**

Optimization of the design of a vertically corrugated transverse bulkhead of an oil tanker.

**Location:** \Engineering\StructuralOptimization

**Page:** Yes

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| **Example** | **Type** | **Status** |
| *Aircraft Assignment* | LP | To do: uncertainty part; skip for first release |

**Description**

Maximization of profits of allocating aircrafts.

**Improvement**

Extension to the same problem with uncertain demands.

**Location:** \Management Science\AircraftAssignement

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| **Example** | **Type** | **Status** |
| *Filter Design* | NLP | Done |

**Description**

Determination of the design of a filter that approximates a desired frequency response as well as possible.

**Location:** \Telecommunications\FilterDesign

**Page:** Yes

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| **Example** | **Type** | **Status** |
| *Network Design* | MIP | Done |

**Description**

Determination of the design of a telecommunication network.

**Location:** \Telecommunications\NetworkDesign

**Page:** No

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| **Example** | **Type** | **Status** |
| *Capacitated Vehicle Routing Problem* | MIP | Done |

**Description**

Vehicle Routing Problem with capacity limited vehicles.

**Location:** \VehicleRoutingProblem\CVRP

**Page:** Yes

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| **Example** | **Type** | **Status** |
| *Vehicle Routing Problem with Time Windows* | MIP | Done |

**Description**

Vehicle Routing Problem with time windows for each customer.

**Location:** \VehicleRoutingProblem\VRPTW

**Page:** Yes

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| **Example** | **Type** | **Status** |
| *Lot Sizing (Single Level Big Bucket Model)* | MIP | Done |

**Description**

“Big Bucket” models are those in which several items can be produced on a machine during a single time period.

**Location:** \LotSizing\SingleLevelBigBucket

**Page:** No

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| **Example** | **Type** | **Status** |
| *Lot Sizing (Single Level Small Bucket Model with 1 Item per Period)* | MIP | Done |

**Description**

Cf. above

**Location:** \LotSizing\SingleLevelSmallBucket

**Page:** No

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| **Example** | **Type** | **Status** |
| *Lot Sizing (Single Level Small Bucket Model with 2 Items per Period)* | MIP | Done |

**Description**

Cf. above

**Location:** \LotSizing\SingleLevelSmallBucketTwoItems

**Page:** No

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| **Example** | **Type** | **Status** |
| *Lot Sizing (Multi-Level Big Bucket Model)* | MIP | Done |

**Description**

Cf. above

**Problem**

Different result from sources.

**Location:** \LotSizing\MultiLevelBucket

**Page:** No

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| **Example** | **Type** | **Status** |
| *Aircraft Landing Problem* | MIP | Done |

**Description**

The ALP is the problem of deciding a landing time on an appropriate runway for each aircraft in a given set of aircraft such that each aircraft lands within a predetermined time window; and separation criteria between the landing of an aircraft, and the landing of all successive aircraft, are respected.

**Location:** \Management Science\AircraftLanding

**Page:** Yes

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| **Example** | **Type** | **Status** |
| *2D Strip Packing* | MIP | Done |

**Description**

Strip packing problems are a class of 2-dimensional allocation problems that are open dimensional, meaning that all items need to be packed into a strip of a given width so as to minimize its height.

**Location:** \\Engineering\2DStripPacking

**Page:** No

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| **Example** | **Type** | **Status** |
| *Capacitated Warehouse Location* | MIP | Done |

**Description**

The capacitated warehouse location problem is the problem of locating a number of warehouses which have to service a set of customers, at minimum cost, where each customer has an associated demand and there are constraints on the total demand that can be met from a warehouse.

**Location:** \WarehouseLocation\CapacitatedWarehouseLocation

**Page:** No

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| **Example** | **Type** | **Status** |
| *Generic Branch-and-Bound* | MINLP | Done |

**Description**

MINLP problem is solved using a generic Branch-and-Bound algorithm implemented in AIMMS using functions from the GMP library.

**Location:** \Energy\WaterDistribution

**Page:** No

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| **Example** | **Type** | **Status** |
| *Dice* | MIP | Done |

**Description**

Retrieving multiple solutions for a MIP problem.

**Location:** \MultipleSolutions\Dice

**Page:** Yes

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| **Example** | **Type** | **Status** |
| *Delay Constrained Routing* | MINLP | Done |

**Description**

Convex MINLP problem is solved GMP-AOA (and COA).

**Location:** \Energy\Telecommunications\DelayConstrainedRouting

**Page:** No