Converting Non-linear Models into Linear Ones

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| “If-then” Logic (Implication) | |
| Variable |  |
| Constant |  |
| Upper bound |  |
| Lower bound |  |
| Usage |  |
| Reference | <http://math.stackexchange.com/questions/112159/what-are-the-algorithms-for-integer-programming-in-which-constraints-are-depende/112927#112927> |

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| --- | --- |
| Boolean Logic on Variables | |
| Variable |  |
| Constant |  |
| Upper bound |  |
| Lower bound |  |
| Usage |  |
| Reference | <https://cs.stackexchange.com/questions/12102/express-boolean-logic-operations-in-zero-one-integer-linear-programming-ilp> |

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| Boolean Logic on Constraints | |
| Variable |  |
| Constant |  |
| Upper bound |  |
| Lower bound |  |
| Usage |  |
| Reference |  |

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| --- | --- |
| Value of Minimal Element | |
| Variable |  |
| Constant |  |
| Upper bound |  |
| Lower bound |  |
| Usage |  |
| Reference | <http://math.stackexchange.com/questions/1858740/how-to-covert-min-min-problem-to-linear-programming-problem/1862709#1862709> |

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| --- | --- |
| Value of Maximal Element | |
| Variable |  |
| Constant |  |
| Upper bound |  |
| Lower bound |  |
| Usage |  |
| Reference | <http://math.stackexchange.com/questions/1858740/how-to-covert-min-min-problem-to-linear-programming-problem/1862709#1862709> |

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| --- | --- |
| Absolute Value | |
| Variable |  |
| Constant |  |
| Upper bound |  |
| Lower bound |  |
| Usage |  |
| Reference | <https://optimization.mccormick.northwestern.edu/index.php/Optimization_with_absolute_values> |

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| --- | --- |
| Cardinality (Test Zero or Non-Zero) | |
| Variable |  |
| Constant |  |
| Upper bound |  |
| Lower bound |  |
| Usage |  |
| Reference |  |

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| --- | --- |
| Semi-continuous/integer Variable | |
| Variable |  |
| Constant |  |
| Upper bound |  |
| Lower bound |  |
| Usage |  |
| Reference | <https://math.stackexchange.com/questions/849319/forbidden-range-for-a-linear-programming-variable> |

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| --- | --- |
| Semi-binding Variable | |
| Variable |  |
| Constant |  |
| Upper bound |  |
| Lower bound |  |
| Usage |  |
| Reference |  |

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| --- | --- |
| Linear-fractional Objective | |
| Variable |  |
| Constant |  |
| Upper bound |  |
| Lower bound |  |
| Usage |  |
| Reference | <https://en.wikipedia.org/wiki/Linear-fractional_programming>  Stancu-Minasian, I. M. *Fractional programming: theory, methods and applications*. Vol. 409. Springer Science & Business Media, 2012.  Bajalinov, Erik B. *Linear-Fractional Programming Theory, Methods, Applications and Software*. Vol. 84. Springer Science & Business Media, 2013. |

Exercises

Note: If the domain of a variable is not specified, it can be in any domain, e.g., .

* If then else is unconstrained
* If then else is unconstrained
  + - Contrapositive:
    - (