6. Refinery Optimisation

# Sets

* set of crude oils {crude 1, crude 2}
* set of naphtha oils {light, medium, heavy}
* set of standard oils {light, heavy, residuum}
* set of gasolines {reformed gasoline, cracked gasoline}
* set of petrols {regular, premium}
* set of selleable products {

# Parameters

* octane number of naphtha
* fractions into which one barrel of crude splits into an oil
* yields of reformed gasoline from naphtha per barrel
* yield of cracked oil from oil per barrel
* yield of cracked gasoline from oil per barrel
* : yield of lube-oil from {residuum oil} per barrel
* : minimum octane number of petrol
* maximum vapor pressure of {jet fuel}
* vapor pressure of oil
* barrels of oil needed to produce one barrel of {fuel oil}
* daily availability of crude
* distilling capacity in barrels
* reforming capacity in barrels
* cracking capacity in barrels
* lube oil upper bound production
* lube oil lower bound production
* profit contribution of product

# Variables

* : barrels of crude distilled
* : barrels of naphtha reformed
* : barrels of oil cracked
* : barrels of oil blended to produce petrol
* : barrels of oil blended to produce {jet fuel}
* barrels produced and sold of product

# Objective

Maximize profit

# Constraints

1. The barrels of naphtha available for reforming and blending petrol depend on the fraction of distilled crude barrels that produce that naphtha
2. The barrels of oils available for cracking and blending jet fuel and fuel oil depend on the distilled crude barrels
3. The barrels of reformed gasoline available for blending petrols depend on the naphtha reformed
4. The barrels of cracked oil available for blending jet fuel and fuel oil depend on the barrels cracked
5. The barrels of cracked gasoline available for blending petrols depend on the barrels cracked
6. The barrels of lube oil available for selling depend on the residuum barrels cracked
7. The barrels of each petrol available for sale depend on the blended naphtha and gasolines
8. Also, the barrels of petrol have each a minimum octane number according to the blended materials
9. The barrels of jet fuel available for sale depends on the blended oils

1. The barrels of jet fuel have a maximum vapor pressure, which depends on blended materials’ pressures
2. Availability of crude (upper bound)
3. Machines capacities
4. Lube oil minimum and maximum production (upper and lower bound)
5. Premium and regular petrol relationship

1. Variable types