

Eryk Walter 151931, Eryk Ptaszyński 151950

## 2.1:

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Our model successfully finds subsets of conflict-free constraints and solves the uta problem for them

## 2.2:

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Ranking for the largest set of consistent preference information:

| Countries  | Utility  | Rank |
|------------|----------|------|
| India      | 0.509122 | 1.0  |
| Ukraine    | 0.33174  | 2.0  |
| Belarus    | 0.326464 | 3.0  |
| Moldova    | 0.313598 | 4.0  |
| Brazil     | 0.296359 | 5.0  |
| Hungary    | 0.286929 | 6.0  |
| Tunisia    | 0.265539 | 7.0  |
| Mongolia   | 0.264306 | 8.0  |
| Armenia    | 0.258263 | 9.0  |
| Ethiopia   | 0.250008 | 10.0 |
| Indonesia  | 0.250005 | 11.0 |
| Romania    | 0.250003 | 12.0 |
| Argentina  | 0.250002 | 13.0 |
| Turkey     | 0.250002 | 14.0 |
| Georgia    | 0.250001 | 15.0 |
| Angola     | 0.25     | 16.0 |
| Greece     | 0.25     | 17.0 |
| Madagascar | 0.249999 | 18.0 |
| Mozambique | 0.249999 | 19.0 |
| Guatemala  | 0.249998 | 20.0 |

| Countries    | Utility  | Rank |
|--------------|----------|------|
| Namibia      | 0.249997 | 21.0 |
| Colombia     | 0.249997 | 22.0 |
| Mexico       | 0.249997 | 23.0 |
| Serbia       | 0.249996 | 24.0 |
| Honduras     | 0.249996 | 25.0 |
| Paraguay     | 0.249995 | 26.0 |
| Philippines  | 0.249995 | 27.0 |
| Peru         | 0.249995 | 28.0 |
| Chile        | 0.249995 | 29.0 |
| Panama       | 0.249992 | 30.0 |
| Slovenia     | 0.249991 | 31.0 |
| Costa Rica   | 0.240379 | 32.0 |
| Spain        | 0.236559 | 33.0 |
| El Salvador  | 0.236384 | 34.0 |
| Tanzania     | 0.210263 | 35.0 |
| Uganda       | 0.202983 | 36.0 |
| South Africa | 0.202506 | 37.0 |
| Portugal     | 0.166676 | 38.0 |
| Thailand     | 0.083341 | 39.0 |

We didn't expect India to rank so high

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MINIMIZE
1*Argentina_P_Guatemala + 1*Colombia_P_Argentina + 1*Colombia_P_Serbia +
1*Greece_P_Colombia + 1*Guatemala_P_Colombia + 1*Serbia_P_Greece + 0
SUBJECT TO
_C1: Gross_Domestic_Product_26.57 = 0

_C2: Gross_Domestic_Product_6427.67 <= 0.5

_C3: Gross_Domestic_Product_6427.67 >= 0.0833333333333333

_C4: Gross_Domestic_Product_1626.84 - Gross_Domestic_Product_26.57 >= 0

_C5: - Gross_Domestic_Product_1626.84 + Gross_Domestic_Product_3227.12 >= 0

_C6: - Gross_Domestic_Product_3227.12 + Gross_Domestic_Product_4827.39 >= 0
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\_C7: - Gross\_Domestic\_Product\_4827.39 + Gross\_Domestic\_Product\_6427.67 >= 0

\_C8: Unemployment\_Rate\_1.18 = 0

\_C9: Unemployment\_Rate\_0.04 <= 0.5

\_C10: Unemployment\_Rate\_0.04 >= 0.08333333333333

\_C11: Unemployment\_Rate\_0.04 - Unemployment\_Rate\_0.32 >= 0

\_C12: Unemployment\_Rate\_0.32 - Unemployment\_Rate\_0.61 >= 0

\_C13: Unemployment\_Rate\_0.61 - Unemployment\_Rate\_0.89 >= 0

\_C14: Unemployment\_Rate\_0.89 - Unemployment\_Rate\_1.18 >= 0

\_C15: Income\_Tax\_Rate\_49.00 = 0

\_C16: Income\_Tax\_Rate\_11.80 <= 0.5

\_C17: Income\_Tax\_Rate\_11.80 >= 0.08333333333333

\_C18: Income\_Tax\_Rate\_11.80 - Income\_Tax\_Rate\_21.10 >= 0

\_C19: Income\_Tax\_Rate\_21.10 - Income\_Tax\_Rate\_30.40 >= 0

\_C20: Income\_Tax\_Rate\_30.40 - Income\_Tax\_Rate\_39.70 >= 0

\_C21: Income\_Tax\_Rate\_39.70 - Income\_Tax\_Rate\_49.00 >= 0

\_C22: Inflation\_3.27 = 0

\_C23: Inflation\_0.02 <= 0.5

\_C24: Inflation\_0.02 >= 0.08333333333333

\_C25: Inflation\_0.02 - Inflation\_0.83 >= 0

\_C26: Inflation\_0.83 - Inflation\_1.64 >= 0

\_C27: Inflation\_1.64 - Inflation\_2.46 >= 0

\_C28: Inflation\_2.46 - Inflation\_3.27 >= 0

\_C29: Total\_Reserves\_978295594.10 = 0

\_C30: Total\_Reserves\_445435000000.00 <= 0.5

\_C31: Total\_Reserves\_445435000000.00 >= 0.08333333333333

\_C32: Total\_Reserves\_112092471695.58 - Total\_Reserves\_978295594.10 >= 0

\_C33: - Total\_Reserves\_112092471695.58 + Total\_Reserves\_223206647797.05 >= 0

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_C34: - Total_Reserves_223206647797.05 + Total_Reserves_334320823898.53 >= 0

_C35: - Total_Reserves_334320823898.53 + Total_Reserves_445435000000.00 >= 0

_C36: GINI_63.00 = 0

_C37: GINI_25.09 <= 0.5

_C38: GINI_25.09 >= 0.0833333333333333

_C39: GINI_25.09 - GINI_34.57 >= 0

_C40: GINI_34.57 - GINI_44.04 >= 0

_C41: GINI_44.04 - GINI_53.52 >= 0

_C42: GINI_53.52 - GINI_63.00 >= 0

_C43: GINI_25.09 + Gross_Domestic_Product_6427.67 + Income_Tax_Rate_11.80
+ Inflation_0.02 + Total_Reserves_445435000000.00 + Unemployment_Rate_0.04
= 1

_C44: Colombia_P_Serbia - 0.625879249784 GINI_34.57
- 0.197684642327 GINI_44.04 + 0.823563892111 GINI_53.52
+ 0.335100851519 Gross_Domestic_Product_1626.84
- 0.335100851519 Gross_Domestic_Product_26.57
- 0.827956989247 Income_Tax_Rate_11.80 - 0.172043010753 Income_Tax_Rate_21.10
+ 0.333333333333 Income_Tax_Rate_30.40 + 0.666666666667 Income_Tax_Rate_39.70
+ 0.563798425461 Inflation_0.02 - 0.563798425461 Inflation_0.83
+ 0.333411362112 Total_Reserves_112092471695.58
- 0.333411362112 Total_Reserves_978295594.10
- 0.00491547936211 Unemployment_Rate_0.04
+ 0.00491547936211 Unemployment_Rate_0.32 >= 1e-06

_C45: - 0.33543376355 GINI_34.57 + 0.33543376355 GINI_44.04
- 0.00233422256544 Gross_Domestic_Product_1626.84
+ 0.00233422256544 Gross_Domestic_Product_26.57
+ 0.827956989247 Income_Tax_Rate_11.80 + 0.172043010753 Income_Tax_Rate_21.10
- 0.698924731183 Income_Tax_Rate_30.40 - 0.301075268817 Income_Tax_Rate_39.70
- 0.047274048863 Inflation_0.02 + 0.047274048863 Inflation_0.83
+ Serbia_P_Greece + 0.0439888766627 Total_Reserves_112092471695.58
- 0.0439888766627 Total_Reserves_978295594.10
- 0.0568748600908 Unemployment_Rate_0.04
+ 0.0568748600908 Unemployment_Rate_0.32 >= 1e-06

_C46: 0.961313013334 GINI_34.57 - 0.137749121223 GINI_44.04
- 0.823563892111 GINI_53.52 + Greece_P_Colombia
- 0.332766628953 Gross_Domestic_Product_1626.84
+ 0.332766628953 Gross_Domestic_Product_26.57
+ 0.365591397849 Income_Tax_Rate_30.40 - 0.365591397849 Income_Tax_Rate_39.70
- 0.516524376598 Inflation_0.02 + 0.516524376598 Inflation_0.83
- 0.377400238775 Total_Reserves_112092471695.58
+ 0.377400238775 Total_Reserves_978295594.10
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+ 0.0617903394529 Unemployment_Rate_0.04
- 0.0617903394529 Unemployment_Rate_0.32 >= 1e-06

_C47: Colombia_P_Argentina - 0.239155920113 GINI_34.57
- 0.584407971998 GINI_44.04 + 0.823563892111 GINI_53.52
- 0.106979930991 Gross_Domestic_Product_1626.84
+ 0.106979930991 Gross_Domestic_Product_26.57
- 0.172043010753 Income_Tax_Rate_30.40 + 0.172043010753 Income_Tax_Rate_39.70
- 0.263580914806 Inflation_0.02 + 0.263580914806 Inflation_0.83
+ 0.0145975187137 Total_Reserves_112092471695.58
- 0.0145975187137 Total_Reserves_978295594.10
+ 0.0486496898959 Unemployment_Rate_0.04
- 0.0486496898959 Unemployment_Rate_0.32 >= 1e-06

_C48: Argentina_P_Guatemala + 0.239155920113 GINI_34.57
+ 0.209847596841 GINI_44.04 - 0.449003516953 GINI_53.52
+ 0.52306369555 Gross_Domestic_Product_1626.84
- 0.52306369555 Gross_Domestic_Product_26.57
- 0.0645161290323 Income_Tax_Rate_21.10
- 0.430107526882 Income_Tax_Rate_30.40 + 0.494623655914 Income_Tax_Rate_39.70
+ 0.183628891393 Inflation_0.02 - 0.183628891393 Inflation_0.83
+ 0.319466468631 Total_Reserves_112092471695.58
- 0.319466468631 Total_Reserves_978295594.10
+ 0.56830187205 Unemployment_Rate_0.04 - 0.56830187205 Unemployment_Rate_0.32
>= 1e-06

_C49: 0.374560375158 GINI_44.04 - 0.374560375158 GINI_53.52
- 0.416083764558 Gross_Domestic_Product_1626.84
+ 0.416083764558 Gross_Domestic_Product_26.57 + Guatemala_P_Colombia
+ 0.0645161290323 Income_Tax_Rate_21.10
+ 0.602150537634 Income_Tax_Rate_30.40 - 0.666666666667 Income_Tax_Rate_39.70
+ 0.0799520234135 Inflation_0.02 - 0.0799520234135 Inflation_0.83
- 0.334063987345 Total_Reserves_112092471695.58
+ 0.334063987345 Total_Reserves_978295594.10
- 0.616951561946 Unemployment_Rate_0.04
+ 0.616951561946 Unemployment_Rate_0.32 >= 1e-06

_C50: Colombia_P_Argentina + Serbia_P_Greece <= 1

_C51: Colombia_P_Argentina + Serbia_P_Greece <= 1

_C52: Colombia_P_Argentina + Colombia_P_Serbia <= 1

_C53: Colombia_P_Argentina + Serbia_P_Greece <= 1

_C54: Colombia_P_Argentina + Colombia_P_Serbia <= 1

_C55: Colombia_P_Argentina + Greece_P_Colombia <= 1

_C56: Colombia_P_Argentina + Serbia_P_Greece <= 1

_C57: Colombia_P_Argentina + Colombia_P_Serbia <= 1

_C58: Colombia_P_Argentina + Greece_P_Colombia <= 1
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_C59: Colombia_P_Serbia + Guatemala_P_Colombia <= 1
_C60: Colombia_P_Argentina + Serbia_P_Greece <= 1
_C61: Colombia_P_Argentina + Colombia_P_Serbia <= 1
_C62: Colombia_P_Argentina + Greece_P_Colombia <= 1
_C63: Colombia_P_Serbia + Guatemala_P_Colombia <= 1
_C64: Guatemala_P_Colombia + Serbia_P_Greece <= 1
_C65: Colombia_P_Argentina + Serbia_P_Greece <= 1
_C66: Colombia_P_Argentina + Colombia_P_Serbia <= 1
_C67: Colombia_P_Argentina + Greece_P_Colombia <= 1
_C68: Colombia_P_Serbia + Guatemala_P_Colombia <= 1
_C69: Guatemala_P_Colombia + Serbia_P_Greece <= 1
_C70: Greece_P_Colombia + Guatemala_P_Colombia <= 1
_C71: Colombia_P_Argentina + Serbia_P_Greece <= 1
_C72: Colombia_P_Argentina + Colombia_P_Serbia <= 1
_C73: Colombia_P_Argentina + Greece_P_Colombia <= 1
_C74: Colombia_P_Serbia + Guatemala_P_Colombia <= 1
_C75: Guatemala_P_Colombia + Serbia_P_Greece <= 1
_C76: Greece_P_Colombia + Guatemala_P_Colombia <= 1
_C77: Argentina_P_Guatemala + Colombia_P_Serbia <= 1
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#### VARIABLES

```
0 <= Argentina_P_Guatemala <= 1 Integer
0 <= Colombia_P_Argentina <= 1 Integer
0 <= Colombia_P_Serbia <= 1 Integer
GINI_25.09 <= 1 Continuous
GINI_34.57 <= 1 Continuous
GINI_44.04 <= 1 Continuous
GINI_53.52 <= 1 Continuous
GINI_63.00 <= 1 Continuous
0 <= Greece_P_Colombia <= 1 Integer
Gross_Domestic_Product_1626.84 <= 1 Continuous
Gross_Domestic_Product_26.57 <= 1 Continuous
Gross_Domestic_Product_3227.12 <= 1 Continuous
Gross_Domestic_Product_4827.39 <= 1 Continuous
Gross_Domestic_Product_6427.67 <= 1 Continuous
```

```
0 <= Guatemala_P_Colombia <= 1 Integer
Income_Tax_Rate_11.80 <= 1 Continuous
Income_Tax_Rate_21.10 <= 1 Continuous
Income_Tax_Rate_30.40 <= 1 Continuous
Income_Tax_Rate_39.70 <= 1 Continuous
Income_Tax_Rate_49.00 <= 1 Continuous
Inflation_0.02 <= 1 Continuous
Inflation_0.83 <= 1 Continuous
Inflation_1.64 <= 1 Continuous
Inflation_2.46 <= 1 Continuous
Inflation_3.27 <= 1 Continuous
0 <= Serbia_P_Greece <= 1 Integer
Total_Reserves_112092471695.58 <= 1 Continuous
Total_Reserves_223206647797.05 <= 1 Continuous
Total_Reserves_334320823898.53 <= 1 Continuous
Total_Reserves_445435000000.00 <= 1 Continuous
Total_Reserves_978295594.10 <= 1 Continuous
Unemployment_Rate_0.04 <= 1 Continuous
Unemployment_Rate_0.32 <= 1 Continuous
Unemployment_Rate_0.61 <= 1 Continuous
Unemployment_Rate_0.89 <= 1 Continuous
Unemployment_Rate_1.18 <= 1 Continuous
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# objective value:

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solution found

Objective value: 2.0

# Plots:

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