

test_cases_summary

Test Case 1

The motivation for this test case was to study interactions between resource rich, resource medium, and resource poor countries. The goal was to study how cooperation between countries functioned when there is a balance between rich, medium and poor countries for rich and poor countries to trade with.

Initial state:

Country	R1	R2	R3	R20	R21	R22	R23	R24
self	35	40	15	40	20	15	40	10
Brobdignag	40	45	20	30	15	15	45	20
Carpania	10	20	11	5	9	7	16	6
Dinotopia	10	15	11	7	5	9	8	8
Erewhon	8	11	15	2	2	1	1	1
Foremz	30	10	3	2	1	0	3	4

Parameter settings:

Your_country_name: 'self'
Resources_filename: 'data/resource_data.xlsx'
Initial_state_filename: 'data/test_case_1.xlsx'
Output_schedule_filename: 'data/output_data1.xlsx'
Num_output_schedules: 5
depth_bound: 10
frontier_max_size: 10

Constant settings within a run:

x_0: 0
k: 5
Gamma: 0.99
Failure cost, C: -0.5

Outcomes:

[illegible]

Test Case 2

The motivation for this test case was to study interactions between resource rich and medium-level resource countries. The goal was to study how cooperation occurs when rich countries cannot take advantage of poor countries for trade, and what occurs when all countries have enough resources to perform transforms instead of relying on transfers.

Initial state:

Country	R1	R2	R3	R21	R22	R23	R24
self	35	40	15	20	15	40	10
Brobdingnag	40	45	20	15	15	45	20
Carpania	10	20	11	9	7	16	6
Dinotopia	10	15	11	5	9	8	8

Parameter settings:

Your country name: 'self'

Resources filename: 'data/resource data.xlsx'

Initial state filename: 'data/test case 2.xlsx'

Output schedule filename: 'data/output data2.xlsx'

Num output schedules: 5

Depth bound: 10

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frontier max size: 10
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Constant settings within a run:

Failure cost, C: -0.5

[illegible]

The motivation for this test case was to study interactions between resource rich and resource poor countries. The goal was to study how cooperation and competition function when countries are dependent on other countries (power imbalance) for transfers and have low resources to transform.

Country	R1	R2	R3	R21	R22	R23	R24
self	35	40	15	20	15	40	10
Brobdignag	40	45	20	15	15	45	20
Erewhon	8	11	15	2	1	1	1
Foremz	30	10	3	1	0	3	4

Depth bound: 5

Country	R1	R2	R3	R21	R22	R23	R24
self	35	40	15	20	15	40	10
Brobdignag	40	45	20	15	15	45	20
Erewhon	8	11	15	2	1	1	1
Foremz	30	10	3	1	0	3	4

frontier_max_size: 10

Constant settings within a run:

x_0: 0

k: 5

Gamma: 0.99

Failure cost, C: -0.5

Outcomes:

A	B	C	D	E	F	G
	Expected Utility of Schedule	Depth 1	Depth 2	Depth 3	Depth 4	Depth 5
Schedule 1				(TRANSFORM self (INPUTS (Population 5) (MetallicElements 3) (MetallicAlloys 2)) (OUTPUTS (Population 5) (Electronics 2) (ElectronicsWaste 1))) EU: 0.16694641783498576	(TRANSFORM self (INPUTS (Population 5) (MetallicElements 3) (MetallicAlloys 2)) (OUTPUTS (Population 5) (Electronics 2) (ElectronicsWaste 1))) EU: 4.655813354059579	(TRANSFORM self (INPUTS (Population 1) (MetallicElements 2) (OUTPUTS (Population 1) (MetallicAlloys 1) (MetallicAlloysWaste 1))) EU: 0.21177845219545496
Schedule 2	Expected Utility: 5.37965031821	(TRANSFORM self (INPUTS (Population 5) (MetallicElements 3) (MetallicAlloys 2)) (OUTPUTS (Population 1) (MetallicElements 2) (MetallicAlloys 1) (MetallicAlloysWaste 1))) EU: 0.16694641783498576		(TRANSFORM self (INPUTS (Population 5) (MetallicElements 3) (MetallicAlloys 2)) (OUTPUTS (Population 5) (Electronics 2) (ElectronicsWaste 1))) EU: 0.188136373909225	(TRANSFORM self (INPUTS (Population 5) (MetallicElements 3) (MetallicAlloys 2)) (OUTPUTS (Population 5) (Electronics 2) (ElectronicsWaste 1))) EU: 4.655813354059579	(TRANSFORM self (INPUTS (Population 1) (Timber 3) (Housing 1)) (OUTPUTS (Population 1) (Food 2) (Housing 1) (FoodWaste 1))) EU: 0.23774751247499998
Schedule 3	Expected Utility: 4.93012435354	(TRANSFORM self (INPUTS (Population 5) (MetallicElements 3) (MetallicAlloys 2)) (OUTPUTS (Population 1) (MetallicElements 2) (MetallicAlloys 1) (MetallicAlloysWaste 1))) EU: 0.16694641783498576		(TRANSFORM self (INPUTS (Population 5) (MetallicElements 3) (MetallicAlloys 2)) (OUTPUTS (Population 5) (Electronics 2) (ElectronicsWaste 1))) EU: 0.188136373909225	(TRANSFORM self (INPUTS (Population 5) (MetallicElements 3) (MetallicAlloys 2)) (OUTPUTS (Population 5) (Electronics 2) (ElectronicsWaste 1))) EU: 4.655813354059579	(TRANSFER self Foremz (Timber 1)) EU: 0.0
Schedule 4	Expected Utility: 4.72823669928	(TRANSFORM self (INPUTS (Population 5) (MetallicElements 3) (MetallicAlloys 2)) (OUTPUTS (Population 1) (MetallicElements 2) (MetallicAlloys 1) (MetallicAlloysWaste 1))) EU: 0.16694641783498576		(TRANSFORM self (INPUTS (Population 5) (MetallicElements 3) (MetallicAlloys 2)) (OUTPUTS (Population 5) (Electronics 2) (ElectronicsWaste 1))) EU: 0.188136373909225	(TRANSFORM self (INPUTS (Population 5) (MetallicElements 3) (MetallicAlloys 2)) (OUTPUTS (Population 5) (Electronics 2) (ElectronicsWaste 1))) EU: 4.655813354059579	(TRANSFER self Foremz (Timber 1)) EU: 0.0
Schedule 5	Expected Utility: 4.68225324084	(TRANSFORM self (INPUTS (Population 5) (MetallicElements 3) (MetallicAlloys 2)) (OUTPUTS (Population 1) (MetallicElements 2) (MetallicAlloys 1) (MetallicAlloysWaste 1))) EU: 0.16694641783498576		(TRANSFORM self (INPUTS (Population 5) (MetallicElements 3) (MetallicAlloys 2)) (OUTPUTS (Population 5) (Electronics 2) (ElectronicsWaste 1))) EU: 0.188136373909225	(TRANSFORM self (INPUTS (Population 5) (MetallicElements 3) (MetallicAlloys 2)) (OUTPUTS (Population 5) (Electronics 2) (ElectronicsWaste 1))) EU: 4.655813354059579	(TRANSFER self Foremz (Timber 1)) EU: 0.0
Schedule 6	Expected Utility: 4.51593977117	(TRANSFORM self (INPUTS (Population 5) (MetallicElements 3) (MetallicAlloys 2)) (OUTPUTS (Population 1) (MetallicElements 2) (MetallicAlloys 1) (MetallicAlloysWaste 1))) EU: 0.16694641783498576		(TRANSFORM self (INPUTS (Population 5) (MetallicElements 3) (MetallicAlloys 2)) (OUTPUTS (Population 5) (Electronics 2) (ElectronicsWaste 1))) EU: 0.188136373909225	(TRANSFORM self (INPUTS (Population 5) (MetallicElements 3) (MetallicAlloys 2)) (OUTPUTS (Population 5) (Electronics 2) (ElectronicsWaste 1))) EU: 4.655813354059579	(TRANSFER self Foremz (Timber 1)) EU: 0.0

Test Case 4

The motivation for this test case was to study interactions between a rich country, medium-resourced countries, and countries with poor resources. The goal was to study how cooperation and competition looks like when there is a less of power imbalance than only rich countries and poor countries.

Initial state:

Country	R1	R2	R3	R21	R22	R23	R24
self	35	40	15	20	15	40	10
Carpania	10	20	11	9	7	16	6
Dinotopia	10	15	11	5	9	8	8
Erewhon	8	11	15	2	1	1	1
Foremz	30	10	3	1	0	3	4

Parameter settings:

Your_country_name: 'self'

Parameter settings:

Your_country_name: 'self'
 Resources_filename: 'data/resource_data.xlsx'
 Initial_state_filename: 'data/test_case_5.xlsx'
 Output_schedule_filename: 'data/output_data5a.xlsx'
 Num_output_schedules: 5
 Depth_bound: 1
 frontier_max_size: 10

Constant settings within a run:

x_0:
 k: 5
 Gamma: 0.99
 Failure cost, C: -0.5

Outcomes:

	A	B	C	D	E	F	G	H	I	J
1		Expected Utility of Schedule	Depth 1							
2	Schedule 1	Expected Utility: 0.267834462160923 (TRANSFER self ((INPUTS (Population 1) (MetallicElements 2)) (OUTPUTS (Population 1) (MetallicAlloys 1) (MetallicAlloysWaste 1))) EU: 0.26783446216092305								
3	Schedule 2	Expected Utility: 0.026159580195337 (TRANSFER Brobdingnag self ((Electronics 1)) EU: 0.495								
4	Schedule 3	Expected Utility: 0.000660579980428 (TRANSFER Brobdingnag self ((Housing 1)) EU: 0.029700000000000247								
5	Schedule 4	Expected Utility: -0.00525705337298 (TRANSFER self Foremz ((Timber 1)) EU: 0.0								
6	Schedule 5	Expected Utility: -0.0075 (TRANSFER self Foremz ((MetallicElements 1)) EU: 0.0								
7										

Test Case 5b

Country	R1	R2	R3	R21	R22	R23	R24
self	50	17	50	13	3	3	3
Brobdingnag	40	45	20	15	15	45	20
Carpania	10	20	11	9	7	16	6
Dinotopia	10	15	11	5	9	8	8
Erewhon	8	11	15	7	7	7	7
Foremz	30	10	8	7	7	7	7

The motivation for this test case was to study a country rich in natural resources, but with low access to manmade resources, with a depth of 3. Our expectation is that the expected utilities will be higher than the expected utilities of depth 1.

Parameter settings:

Your_country_name: 'self'
 Resources_filename: 'data/resource_data.xlsx'
 Initial_state_filename: 'data/test_case_5.xlsx'
 Output_schedule_filename: 'data/output_data5b.xlsx'

Num_output_schedules: 5
Depth_bound: 3
frontier_max_size: 10

Constant settings within a run:
x_0: 0
k: 5
Gamma: 0.99
Failure cost, C: -0.5

Outcomes:

	A	B	C	D	E	F
		Expected Utility of Schedule	Depth 1	Depth 2	Depth 3	
1	Schedule 1			(TRANSFORM self (INPUTS (Population 1) (MetallicElements 2)) (OUTPUTS (Population 1) (MetallicAlloys 1))) EU: 0.21607841260632032	(TRANSFORM self (INPUTS (Population 1) (MetallicElements 2)) (OUTPUTS (Population 1) (MetallicAlloys 1))) EU: 0.21607841260632032	
2	Schedule 2	Expected Utility: 0.71627164002	(TRANSFORM self (INPUTS (Population 1) (MetallicElements 2)) (OUTPUTS (Population 1) (MetallicAlloys 1))) EU: 0.21607841260632032	(TRANSFORM self (INPUTS (Population 1) (MetallicElements 2)) (OUTPUTS (Population 1) (MetallicAlloys 1))) EU: 0.21607841260632032	(TRANSFORM self (INPUTS (Population 1) (MetallicElements 2)) (OUTPUTS (Population 1) (MetallicAlloys 1))) EU: 0.21607841260632032	
3	Schedule 3	Expected Utility: 0.53366444999	(TRANSFORM self (INPUTS (Population 1) (MetallicElements 2)) (OUTPUTS (Population 1) (MetallicAlloys 1))) EU: 0.53366444999	(TRANSFORM self (INPUTS (Population 1) (MetallicElements 2)) (OUTPUTS (Population 1) (MetallicAlloys 1))) EU: 0.53366444999	(TRANSFORM self (INPUTS (Population 1) (MetallicElements 2)) (OUTPUTS (Population 1) (MetallicAlloys 1))) EU: 0.53366444999	
4	Schedule 4	Expected Utility: 0.53366444999	(TRANSFORM self (INPUTS (Population 1) (MetallicElements 2)) (OUTPUTS (Population 1) (MetallicAlloys 1))) EU: 0.53366444999	(TRANSFORM self (INPUTS (Population 1) (MetallicElements 2)) (OUTPUTS (Population 1) (MetallicAlloys 1))) EU: 0.53366444999	(TRANSFORM self (INPUTS (Population 1) (MetallicElements 2)) (OUTPUTS (Population 1) (MetallicAlloys 1))) EU: 0.53366444999	
5	Schedule 5	Expected Utility: 0.43591477544	(TRANSFORM self (INPUTS (Population 1) (MetallicElements 2)) (OUTPUTS (Population 1) (MetallicAlloys 1))) EU: 0.43591477544	(TRANSFORM self (INPUTS (Population 1) (MetallicElements 2)) (OUTPUTS (Population 1) (MetallicAlloys 1))) EU: 0.43591477544	(TRANSFER self Forenz ((Timber 1)) EU: 0.0	
6		Expected Utility: 0.25761847741	(TRANSFORM self (INPUTS (Population 1) (MetallicElements 2)) (OUTPUTS (Population 1) (MetallicAlloys 1))) EU: 0.25761847741	(TRANSFORM self (INPUTS (Population 1) (MetallicElements 2)) (OUTPUTS (Population 1) (MetallicAlloys 1))) EU: 0.25761847741	(TRANSFORM self (INPUTS (Population 1) (Timber 3) (Housing 1)) (OUTPUTS (Population 1) (Food 2) (Housing 1) (FoodWaste 1))) EU: -0.24257475	
7						

Test Case 5c

Country	R1	R2	R3	R21	R22	R23	R24
self	50	17	50	13	3	3	3
Brobdingnag	40	45	20	15	15	45	20
Carpania	10	20	11	9	7	16	6
Dinotopia	10	15	11	5	9	8	8
Erewhon	8	11	15	7	7	7	7
Foremz	30	10	8	7	7	7	7

The motivation for this test case was to study a country rich in natural resources, but with low access to manmade resources, with a depth of 5. Our expectation is to see higher expected utilities with a greater depth.

Parameter settings:

Your_country_name: 'self'

Resources_filename: 'data/resource_data.xlsx'

Initial_state_filename: 'data/test_case_5.xlsx'

Output_schedule_filename: 'data/output_data5c.xlsx'

Num_output_schedules: 5

Depth_bound: 5

frontier_max_size: 10

Constant settings within a run:

x_0:

k: 5

Gamma: 0.99

Failure cost, C: -0.5

Outcomes

	Expected Utility of Schedule	Depth 1	Depth 2	Depth 3	Depth 4	Depth 5		
Schedule 1	Expected Utility: 0.6779342338978686	(TRANSFORM self (INPUTS (Population 1) (MetallicElements 2)) (OUTPUTS (Pop	(TRANSFORM self (INPUTS (Population 1) (MetallicElements	(TRANSFORM self (INPUTS (Population 1)	(TRANSFER self Foremz (((TRANSFER self Foremz ((Timber 1)) EU: -0.0053775699255773825		
Schedule 2	Expected Utility: 0.6779342338978686	(TRANSFORM self (INPUTS (Population 1) (MetallicElements 2)) (OUTPUTS (Pop	(TRANSFORM self (INPUTS (Population 1) (MetallicElements 2)) (OUTPUTS (Population 1) (MetallicAlloys 1) (MetallicAlloyWaste 1)) EU: 0.2400895667218065	(TRANSFER self Foremz ((Timber 1)) EU: 0.0	(TRANSFORM self (INPUTS (Population 1) (MetallicElements 2)) (OUTPUTS (Population 1) (MetallicAlloys 1) (MetallicAlloyWaste 1)) EU: -0.0053775699255773825			
Schedule 3								
			(TRANSFORM self (INPUTS (Population 1) (MetallicElements 2)) (OUTPUTS (Population 1) (MetallicAlloys 1) (MetallicAlloyWaste 1)) EU: 0.2400895667218065	(TRANSFORM self (INPUTS (Population 1) (MetallicElements 2)) (OUTPUTS (Population 1) (MetallicAlloys 1) (MetallicAlloyWaste 1)) EU: 0.21607841260632032	(TRANSFER self Foremz ((Timber 1)) EU: 0.0	(TRANSFER self Foremz ((MetallicElements 1)) EU: -0.0075		
Schedule 4	Expected Utility: 0.6417291398396782	(TRANSFORM self (INPUTS (Population 1) (MetallicElements 2)) (OUTPUTS (Pop	(TRANSFORM self (INPUTS (Population 1) (MetallicElements 2)) (OUTPUTS (Population 1) (MetallicAlloys 1) (MetallicAlloyWaste 1)) EU: 0.2400895667218065	(TRANSFER self Foremz ((Timber 1)) EU: 0.0	(TRANSFORM self (INPUTS (Population 1) (MetallicElements 2)) (OUTPUTS (Population 1) (MetallicAlloys 1) (MetallicAlloyWaste 1)) EU: 0.07335541784556646	(TRANSFER self Foremz ((MetallicElements 1)) EU: -0.0075		
Schedule 5	Expected Utility: 0.4842551151315782	(TRANSFORM self (INPUTS (Population 1) (MetallicElements 2)) (OUTPUTS (Pop	(TRANSFORM self (INPUTS (Population 1) (MetallicElements 2)) (OUTPUTS (Population 1)	(TRANSFORM self (INPUTS (Population 5) (MetallicElements 3) (MetallicAlloys	(TRANSFER self Foremz ((Timber 1)) EU: 0.0	(TRANSFER self Foremz ((Timber 1)) EU: -0.0053775699255773825		