

Package ‘CGE’

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Type Package

Title Computing General Equilibrium

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License GPL-2 | GPL-3

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CD_A

Cobb-Douglas Demand Structure Matrix

Description

This function computes the Cobb-Douglas demand structure matrix.

Usage

CD_A(alpha, Beta, p)

Arguments

alpha a nonnegative numeric m-vector or m-by-1 matrix.
 Beta a nonnegative numeric n-by-m matrix whose each column sum equals 1.
 p a nonnegative numeric n-vector or n-by-1 matrix.

Value

A n-by-m matrix is computed which indicates the demand structure of agents (firms or consumers) with Cobb-Douglas production functions or utility functions under the price vector p.

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Examples

```
CD_A(1, rbind(0.5, 0.5), c(1, 2))

#####
alpha <- rbind(5, 3, 1)
Beta <- matrix(c(
  0.6, 0.4, 0.2,
  0.1, 0.4, 0.7,
  0.3, 0.2, 0.1
), 3, 3, TRUE)
p <- 1:3
CD_A(alpha, Beta, p)
```

CD_mA

Cobb-Douglas Monetary Demand Structure Matrix

Description

This function computes a Cobb-Douglas monetary demand structure matrix in a monetary economy.

Usage

```
CD_mA(alpha, Beta, p)
```

Arguments

alpha a nonnegative numeric m-vector or m-by-1 matrix.
 Beta nonnegative numeric n-by-m matrix whose each column sum equals 1.
 p a nonnegative numeric n-vector or n-by-1 matrix.

Details

Some elements of Beta corresponding to money equal -1.

Value

A n-by-m matrix is computed which indicates the (monetary) demand structure of agents (firms or consumers) with Cobb-Douglas production functions or utility functions under the price vector p.

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Examples

```
alpha <- c(1, 1, 1)
Beta <- matrix(c(
  0.5, 0.5, 0.5,
  0.5, 0.5, 0.5,
  -1, -1, -1
), 3, 3, TRUE)
p <- 1:3
CD_mA(alpha, Beta, p)
```

CES_A

CES Demand Structure Matrix

Description

This function computes the CES demand structure matrix.

Usage

```
CES_A(sigma, alpha, Beta, p, Theta = NULL)
```

Arguments

| | |
|-------|--|
| sigma | a numeric m-vector or m-by-1 matrix. |
| alpha | a nonnegative numeric m-vector or m-by-1 matrix. |
| Beta | a nonnegative numeric n-by-m matrix. |
| p | a nonnegative numeric n-vector or n-by-1 matrix. |
| Theta | null or a positive numeric n-by-m matrix. |

Value

A n-by-m matrix is computed which indicates the demand structure of agents (firms or consumers) with CES production functions or utility functions (e.g. $\alpha \cdot (\beta_1 \cdot (x_1/\theta_1)^\sigma + \beta_2 \cdot (x_2/\theta_2)^\sigma)^{1/\sigma}$) under the price vector p .

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Examples

```

CES_A(-1, 2, rbind(0.2, 0.1), c(1, 2))

#####
sigma <- c(-1, -1, -1)
alpha <- c(1, 1, 1)
Beta <- matrix(c(
  0, 1, 1,
  1, 0, 0,
  1, 0, 0
), 3, 3, TRUE)
p <- 1:3
CES_A(sigma, alpha, Beta, p)

#####
sigma <- -1e-10
alpha <- 1
Beta <- rbind(0.8, 0.2)
Theta <- rbind(2, 1)
p <- c(1, 1)
CES_A(sigma, alpha, Beta, p, Theta)
CD_A(alpha * prod(Theta^(-Beta)), Beta, p)

CES_A(-1e5, alpha, Beta, p, Theta)

```

CES_mA

CES Monetary Demand Structure Matrix

Description

This function computes a CES monetary demand structure matrix in a monetary economy.

Usage

```
CES_mA(sigma, alpha, Beta, p, Theta = NULL)
```

Arguments

| | |
|-------|---|
| sigma | a numeric m-vector or m-by-1 matrix. |
| alpha | a nonnegative numeric m-vector or m-by-1 matrix. |
| Beta | a nonnegative numeric n-by-m matrix whose each column sum equals 1. |
| p | a nonnegative numeric n-vector or n-by-1 matrix. |
| Theta | null or a positive numeric n-by-m matrix. |

Details

Some elements of Beta corresponding to money equal -1.

Value

A n-by-m matrix is computed which indicates the (monetary) demand structure of agents (firms or consumers) with CES production functions or utility functions under the price vector p.

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Examples

```
alpha <- matrix(1, 6, 1)
Beta <- matrix(c(
  0, 1, 1, 0, 1, 1,
  0.5, 0, 0, 0, 0, 0,
  -1, -1, -1, 0, 0, 0,
  0.5, 0, 0, 0.5, 0, 0,
  0, 0, 0, 0.5, 0, 0,
  0, 0, 0, -1, -1, -1
), 6, 6, TRUE)
p <- 1:6
CES_mA(rep(-1, 6), alpha, Beta, p)
```

Description

This data set gives parameters of a CGE model of China based on the input-output table of 2012.

Usage

ChinaCGE2012

Format

A list containing the following components:

| | | |
|---------------|-----------|--|
| A(state) | function | a function which returns a demand structure 41-by-38 matrix under a given price 41-vector. |
| B | numeric | a supply matrix 41-by-38 matrix. |
| S0Exg | numeric | an exogenous supply 41-by-38 matrix. |
| z0 | numeric | an initial activity level (or production level) 38-vector. |
| subject.names | character | names of 41 subjects (or commodities). |
| sector.names | character | names of 38 sectors. |

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Examples

```
ChinaCGE2012$A(list(p = rep(1, 41)))

#####
cge <- function(GRExg = 0) {
  sdm(
    A = ChinaCGE2012$A,
    B = ChinaCGE2012$B,
    S0Exg = ChinaCGE2012$S0Exg,
    GRExg = GRExg,
    z0 = ChinaCGE2012$z0,
    priceAdjustmentVelocity = 0.03
  )
}

#####
ge0 <- cge()
names(ge0$p) <- ChinaCGE2012$subject.names
ge0$p

names(ge0$z) <- ChinaCGE2012$sector.names
ge0$z

#####
ge6 <- cge(GRExg = 0.06)
names(ge6$p) <- ChinaCGE2012$subject.names
```



```
ge6$p
names(ge6$z) <- ChinaCGE2012$sector.names
ge6$z
```

dg *A Modified diag Function*

Description

This function works in the way analogous to the diag function of Matlab.

Usage

```
dg(x)
```

Arguments

x a number, vector or square matrix.

Value

If x is a number, dg returns itself. If x is a vector, a one-row matrix or a one-column matrix, dg returns a matrix with x as the main diagonal. Otherwise dg returns diag(x).

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

Examples

```
diag(matrix(2, 3))
dg(matrix(2, 3))
```

Example.MWG.15.B.1 *Example 15.B.1 in MWG (1995)*

Description

This is Example 15.B.1 in MWG (1995, P519), which is a pure exchange Cobb-Douglas 2-by-2 economy.

Usage

```
Example.MWG.15.B.1(
  a = 0.1,
  S0Exg = matrix(c(
    1, 2,
    2, 1
  ), 2, 2, TRUE)
)
```

Arguments

a Each consumer has the Cobb-Douglas utility function $x_1^a x_2^{(1-a)}$.

S0Exg exogenous supply matrix which will be passed to the function `sdm`.

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Mas-Colell, Andreu and Whinston, Michael Dennis and Green, Jerry R. (1995, ISBN: 0195073401). Microeconomic Theory. Oxford University Press (New York).

Examples

```
Example.MWG.15.B.1()

#####
Example.MWG.15.B.1(a = 0.2)

#####
S <- matrix(c(
  18, 72,
  40, 20
), 2, 2, TRUE)
ge <- Example.MWG.15.B.1(a = 0.2, S0Exg = S)
ge$p / ge$p[1]
```

Example.MWG.15.B.2 *Example 15.B.2 in MWG (1995)*

Description

This is Example 15.B.2 in MWG (1995, P521), which is a pure exchange 2-by-2 economy with quasilinear utility functions.

Usage

```
Example.MWG.15.B.2(p0 = c(1, 0.3))
```

Arguments

`p0` an initial price 2-vector, which will be passed to the function `sdm`.

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Mas-Colell, Andreu and Whinston, Michael Dennis and Green, Jerry R. (1995, ISBN: 0195073401). Microeconomic Theory. Oxford University Press (New York).

Examples

```
ge <- Example.MWG.15.B.2()
ge$p

#####
ge <- Example.MWG.15.B.2(p0 = c(0.3, 1))
ge$p

#####
ge <- Example.MWG.15.B.2(p0 = c(1, 1))
ge$p
```

Example.MWG.Exercise.15.B.6

Exercise 15.B.6 in MWG (1995)

Description

This is Exercise 15.B.6 in MWG (1995, P541), which is a pure exchange CES 2-by-2 economy.

Usage

```
Example.MWG.Exercise.15.B.6(p0 = c(1, 2))
```

Arguments

`p0` an initial price 2-vector, which will be passed to the function `sdm`.

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Mas-Colell, Andreu and Whinston, Michael Dennis and Green, Jerry R. (1995, ISBN: 0195073401). Microeconomic Theory. Oxford University Press (New York).

Examples

```
ge <- Example.MWG.Exercise.15.B.6()
ge$p / ge$p[2] # (3/4)^3

#####
ge <- Example.MWG.Exercise.15.B.6(p0 = c(2, 1))
ge$p / ge$p[2] # (4/3)^3

#####
ge <- Example.MWG.Exercise.15.B.6(p0 = c(1, 1))
ge$p
```

Example.MWG.Exercise.15.B.9

Exercise 15.B.9 in MWG (1995)

Description

This is Exercise 15.B.9 in MWG (1995, P541), which is a pure exchange 2-by-2 economy.

Usage

```
Example.MWG.Exercise.15.B.9(
  S0Exg = matrix(c(
    30, 0,
    0, 20
  ), 2, 2, TRUE)
)
```

Arguments

S0Exg an exogenous supply matrix, which will be passed to the function sdm.

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Mas-Colell, Andreu and Whinston, Michael Dennis and Green, Jerry R. (1995, ISBN: 0195073401). Microeconomic Theory. Oxford University Press (New York).

Examples

```
Example.MWG.Exercise.15.B.9()
```

```
#####
```

```
S <- matrix(c(
```

```
  5, 0,
```

```
  0, 20
```

```
), 2, 2, TRUE)
```

```
Example.MWG.Exercise.15.B.9(S0Exg = S)
```

Example.Section.3.1.2.corn

Example in Section.3.1.2 of Li (2019)

Description

This is the example in Section.3.1.2 of Li (2019), which is a Leontief-type two-sector corn economy.

Usage

```
Example.Section.3.1.2.corn()
```

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Example.Varian.Exercise.18.2

Exercise 18.2 in Varian (1992)

Description

This is Exercise 18.2 in Varian (1992, P357), which is a Cobb-Douglas 3-by-4 economy.

Usage

Example.Varian.Exercise.18.2()

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Varian, Hal R. (1992, ISBN: 0393957357). Microeconomic Analysis. W. W. Norton & Company.

Examples

```
ge <- Example.Varian.Exercise.18.2()
ge$A %*% diag(ge$z) #input matrix
```

Example.Varian.P352 *Example on Page 352 in Varian (1992)*

Description

This is the example on page 352 in Varian (1992) (see also Example 15.C.2. in MWG, 1995, P542), which is a decreasing-returns-to-scale Cobb-Douglas 3-by-2 economy and can be transformed into a constant-returns-to-scale 3-by-3 (or 3-by-2) economy.

Usage

Example.Varian.P352(agent.number = 3)

Arguments

agent.number agent.number can be set to 3 or 2.

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Mas-Colell, Andreu and Whinston, Michael Dennis and Green, Jerry R. (1995, ISBN: 0195073401). Microeconomic Theory. Oxford University Press (New York).

Varian, Hal R. (1992, ISBN: 0393957357). Microeconomic Analysis. W. W. Norton & Company.

Examples

Example.Varian.P352()

#####

Example.Varian.P352(agent.number = 2)

Example2.2

Example 2.2 in Li (2019)

Description

This is Example 2.2 in Li (2019), which is a Cobb-Douglas pure production economy.

Usage

Example2.2()

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Example2.3

Example2.3 in Li (2019)

Description

This is Example 2.3 in Li (2019), which is a von Neumann economy.

Usage

Example2.3()

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Example3.1

Example 3.1 in Li (2019)

Description

This is Example 3.1 in Li (2019), which is a two-sector corn economy with a non-homothetic utility function.

Usage

Example3.1()

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Example3.10

Example 3.10 in Li (2019)

Description

This is Example 3.10 in Li (2019), which is a Leontief corn economy with three primary factors.

Usage

Example3.10()

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Example3.12

Example 3.12 in Li (2019)

Description

This is Example 3.12 in Li (2019), which is an economy with decreasing returns to scale.

Usage

Example3.12()

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Example3.14

Example 3.14 in Li (2019)

Description

This is Example 3.14 in Li (2019), which illustrates the relationship between a regular economy and a pure exchange economy.

Usage

Example3.14()

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Example3.2

Example 3.2 in Li (2019)

Description

This is Example 3.2 in Li (2019), which is a Cobb-Douglas two-sector corn economy.

Usage

Example3.2()

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Example3.4

Example 3.4 in Li (2019)

Description

This is Example 3.2 in Li (2019), which is a Lontief three-sector economy with one primary factor.

Usage

Example3.4()

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Example3.8

Example 3.8 in Li (2019)

Description

This is Example 3.8 in Li (2019), which is a Cobb-Douglas three-sector economy with one primary factor.

Usage

Example3.8()

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Example3.9

Example 3.9 in Li (2019)

Description

This is Example 3.9 in Li (2019), which is a Cobb-Douglas three-sector economy with two primary factors.

Usage

Example3.9()

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Example4.10

Example 4.10 in Li (2019)

Description

This is Example 4.10 in Li (2019), which illustrates the tax.

Usage

Example4.10()

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Example4.11.1

First Part of Example 4.11 in Li (2019)

Description

This is the first part of Example 4.11 in Li (2019), which illustrates the tax.

Usage

Example4.11.1()

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Example4.11.2

Second Part of Example 4.11 in Li (2019)

Description

This is the second part of Example 4.11 in Li (2019), which illustrates the tax.

Usage

Example4.11.2()

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Example4.12

Example 4.12 in Li (2019)

Description

This is Example 4.12 in Li (2019), which illustrates the tax.

Usage

Example4.12()

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Example4.13

Example 4.13 in Li (2019)

Description

This is Example 4.13 in Li (2019), which illustrates the dividend.

Usage

Example4.13()

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Example4.15

Example 4.15 in Li (2019)

Description

This is Example 4.15 in Li (2019), which illustrates over-investment.

Usage

Example4.15()

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Example4.16

Example 4.16 in Li (2019)

Description

This is Example 4.16 in Li (2019), which illustrates technology monopoly.

Usage

Example4.16()

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Example4.2

Example 4.2 in Li (2019)

Description

This is Example 4.2 in Li (2019), which illustrates the non-sufficient supply of the primary factor.

Usage

Example4.2()

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Example4.8

Example 4.8 in Li (2019)

Description

This is Example 4.8 in Li (2019), which illustrates the increasing returns to scale.

Usage

Example4.8()

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Example4.9

Example 4.9 in Li (2019)

Description

This is Example 4.9 in Li (2019), which illustrates the price signal.

Usage

Example4.9()

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Example5.1

Example 5.1 in Li (2019)

Description

This is Example 5.1 in Li (2019), which illustrates fixed assets.

Usage

Example5.1()

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Example5.10

Example 5.10 in Li (2019)

Description

This is Example 5.10 in Li (2019), which illustrates pollution.

Usage

Example5.10()

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Example5.11.1

First Part of Example 5.11 in Li (2019)

Description

This is the first part of Example 5.11 in Li (2019), which illustrates pollution.

Usage

Example5.11.1()

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Example5.11.2

Second Part of Example 5.11 in Li (2019)

Description

This is the second part of Example 5.11 in Li (2019), which illustrates pollution.

Usage

Example5.11.2()

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Example5.2

Example 5.2 in Li (2019)

Description

This is Example 5.2 in Li (2019), which illustrates fixed assets.

Usage

Example5.2()

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Example5.3.1

First Part of Example 5.3 in Li (2019)

Description

This is the first part of Example 5.3 in Li (2019), which illustrates fixed assets.

Usage

Example5.3.1()

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Example5.3.2

Second Part of Example 5.3 in Li (2019)

Description

This is the second part of Example 5.3 in Li (2019), which illustrates fixed assets.

Usage

Example5.3.2()

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Example5.4

Example 5.4 in Li (2019)

Description

This is Example 5.4 in Li (2019), which illustrates fixed assets.

Usage

Example5.4()

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Example5.5

Example 5.5 in Li (2019)

Description

This is Example 5.5 in Li (2019), which illustrates fixed assets.

Usage

Example5.5()

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Example5.6

Example 5.6 in Li (2019)

Description

This is Example 5.6 in Li (2019), which illustrates fixed assets.

Usage

Example5.6()

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Example6.10

Example 6.10 in Li (2019)

Description

This is Example 6.10 in Li (2019), which illustrates a two-country economy.

Usage

Example6.10()

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Example6.11

Example 6.11 in Li (2019)

Description

This is Example 6.11 in Li (2019), which illustrates a two-country economy.

Usage

Example6.11()

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

`Example6.13`*Example 6.13 in Li (2019)*

Description

This is Example 6.13 in Li (2019), which illustrates a two-country economy.

Usage

```
Example6.13()
```

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Examples

```
ge <- Example6.13()
matplot(ge$ts.p, type = "l")
matplot(ge$ts.z, type = "l")
```

`Example6.2.1`*First Part of Example 6.2 in Li (2019)*

Description

This is the first part of Example 6.2 in Li (2019), which illustrates a two-country economy.

Usage

```
Example6.2.1()
```

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Example6.2.2

Second Part of Example 6.2 in Li (2019)

Description

This is the second part of Example 6.2 in Li (2019), which illustrates a two-country economy.

Usage

Example6.2.2()

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Example6.3

Example 6.3 in Li (2019)

Description

This is Example 6.3 in Li (2019), which illustrates a two-country economy.

Usage

Example6.3()

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Example6.4

Example 6.4 in Li (2019)

Description

This is Example 6.4 in Li (2019), which illustrates a two-country economy.

Usage

Example6.4()

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Example6.5

Example 6.5 in Li (2019)

Description

This is Example 6.5 in Li (2019), which illustrates a two-country economy.

Usage

Example6.5()

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Example6.6.1

First Part of Example 6.6 in Li (2019)

Description

This is the first part of Example 6.6 in Li (2019), which illustrates a two-country economy.

Usage

Example6.6.1()

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Example6.6.2

Second Part of Example 6.6 in Li (2019)

Description

This is the second part of Example 6.6 in Li (2019), which illustrates the first country of a two-country economy.

Usage

Example6.6.2()

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Example6.6.3

Third Part of Example 6.6 in Li (2019)

Description

This is the third part of Example 6.6 in Li (2019), which illustrates the second country of a two-country economy.

Usage

Example6.6.3()

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Example6.7

Example 6.7 in Li (2019)

Description

This is Example 6.7 in Li (2019), which illustrates a two-country economy.

Usage

Example6.7()

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Example6.9

Example 6.9 in Li (2019)

Description

This is Example 6.9 in Li (2019), which illustrates a two-country economy.

Usage

Example6.9()

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Example7.1

Example 7.1 in Li (2019)

Description

This is Example 7.1 in Li (2019), which illustrates a monetary pure exchange economy.

Usage

Example7.1()

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Example7.10

Example 7.10 in Li (2019)

Description

This is Example 7.10 in Li (2019), which illustrates fiat money and representative money.

Usage

Example7.10()

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Example7.10.2

Extra Part of Example 7.10 in Li (2019)

Description

This is an extra part of Example 7.10 in Li (2019), which illustrates fiat money and representative money.

Usage

Example7.10.2()

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Example7.11

Example 7.11 in Li (2019)

Description

This is Example 7.11 in Li (2019), which illustrates bond.

Usage

Example7.11()

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Example7.12

Example 7.12 in Li (2019)

Description

This is Example 7.12 in Li (2019), which illustrates the foreign exchange rate and international credit.

Usage

Example7.12()

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Example7.13

Example 7.13 in Li (2019)

Description

This is Example 7.13 in Li (2019), which illustrates indirect financing based on commercial banks.

Usage

Example7.13()

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Example7.14

Example 7.14 in Li (2019)

Description

This is Example 7.14 in Li (2019), which illustrates shadow prices.

Usage

Example7.14()

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Example7.15

Example 7.15 in Li (2019)

Description

This is Example 7.15 in Li (2019), which illustrates shadow prices and international trade.

Usage

Example7.15()

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Example7.2

Example 7.2 in Li (2019)

Description

This is Example 7.2 in Li (2019), which illustrates a monetary Cobb-Douglas zero-growth corn economy.

Usage

Example7.2()

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Example7.3

Example 7.3 in Li (2019)

Description

This is Example 7.3 in Li (2019), which illustrates a monetary Leontief corn economy.

Usage

Example7.3()

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Example7.4

Example 7.4 in Li (2019)

Description

This is Example 7.4 in Li (2019), which illustrates a monetary Cobb-Douglas positive-growth corn economy.

Usage

Example7.4()

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Example7.5.1

First Part of Example 7.5 in Li (2019)

Description

This is the first part of Example 7.5 in Li (2019), which illustrates a monetary Cobb-Douglas corn economy including dividend.

Usage

Example7.5.1()

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Example7.5.2

Second Part of Example 7.5 in Li (2019)

Description

This is the second part of Example 7.5 in Li (2019), which illustrates a monetary Cobb-Douglas corn economy including dividend.

Usage

Example7.5.2()

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Example7.6

Example 7.6 in Li (2019)

Description

This is Example 7.6 in Li (2019), which illustrates foreign exchange rates.

Usage

Example7.6()

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Example7.7

Example 7.7 in Li (2019)

Description

This is Example 7.7 in Li (2019), which illustrates foreign exchange rates.

Usage

Example7.7()

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Example7.8

Example 7.8 in Li (2019)

Description

This is Example 7.8 in Li (2019), which illustrates commodity money.

Usage

Example7.8()

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Example7.9X

Example 7.9 in Li (2019)

Description

This is Example 7.9 in Li (2019), which illustrates commodity money and representative money.

Usage

Example7.9X()

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Example8.1

Example 8.1 in Li (2019)

Description

This is Example 8.1 in Li (2019), which expounds the equilibrium coffee problem.

Usage

Example8.1()

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Example8.2

Example 8.2 in Li (2019)

Description

This is Example 8.2 in Li (2019), which expounds a Cobb-Douglas market-clearing exchange process.

Usage

Example8.2()

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

`Example8.7`*Example 8.7 in Li (2019)*

Description

This is Example 8.7 in Li (2019), which discusses price changes in the coffee economy.

Usage`Example8.7()`**Author(s)**`LI Wu <liwu@staff.shu.edu.cn>`**References**

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Examples

```
ge <- Example8.7()
matplot(ge$ts.p, type = "l")
matplot(ge$ts.z, type = "l")
```

`Example8.8`*Example 8.8 in Li (2019)*

Description

This is Example 8.8 in Li (2019), which illustrates a dynamic exchange model with one type of money.

Usage`Example8.8()`**Author(s)**`LI Wu <liwu@staff.shu.edu.cn>`**References**

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Examples

```
ge <- Example8.8()
matplot(ge$ts.p, type = "l")
matplot(ge$ts.z, type = "l")
```

Example8.9

Example 8.9 in Li (2019)

Description

This is Example 8.9 in Li (2019), which illustrates a dynamic exchange model with multiple types of money.

Usage

```
Example8.9()
```

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Examples

```
ge <- Example8.9()
matplot(ge$ts.p, type = "l")
matplot(ge$ts.z, type = "l")
```

Example9.10

Example 9.10-9.14 in Li (2019)

Description

This is Example 9.10-14 in Li (2019), which illustrates economic cycles in a monetary economy and economic policies ironing economic cycles.

Usage

```
Example9.10(
  policy = NULL,
  pExg = rbind(NA, NA, 0.25),
  p0 = rbind(0.625, 0.375, 0.25),
  priceAdjustmentVelocity = 0.3,
  ts = TRUE
)
```

Arguments

Those arguments will be passed to the function `sdm`. See [sdm](#).

`policy` a policy function

`pExg` an n-vector indicating the exogenous prices (if any).

`p0` an initial price n-vector.

`priceAdjustmentVelocity` the price adjustment velocity.

`ts` if TRUE, the time series of the last iteration are returned.

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

See Also

[sdm](#); [Example9.10.policy.interest.rate](#); [Example9.10.policy.money.supply](#); [Example9.10.policy.deflation](#); [Example9.10.policy.quantitative.easing](#); [Example9.10.policy.tax](#); [Example9.10.policy.deficit.fiscal](#)

Examples

```
##### no policy
ge <- Example9.10()
matplot(ge$ts.p, type = "l")
matplot(ge$ts.z, type = "l")

##### interest rate policy (Fig. 9.12)
Example9.10(policy = Example9.10.policy.interest.rate)

##### monetary supply policy (Fig. 9.13)
Example9.10(policy = Example9.10.policy.money.supply)

##### deflation policy (Fig. 9.14)
ge <- Example9.10(
  policy = Example9.10.policy.deflation,
```



```

    pExg = rbind(NA, NA, 0),
    p0 = rbind(0.625, 0.375, 0), ts = TRUE
  )
plot(ge$ts.S[3, 3, ], type = "l")
plot(ge$ts.q[, 3], type = "l")

##### quantitative easing policy (Fig. 9.15)
ge <- Example9.10(
  policy = Example9.10.policy.quantitative.easing,
  pExg = rbind(NA, NA, 0),
  p0 = rbind(0.625, 0.375, 0),
  ts = TRUE
)
plot(log(ge$ts.S[3, 3, ]), type = "l")
plot(ge$ts.q[, 3], type = "l")
plot(log(ge$ts.p[, 1]), type = "l")
lines(log(ge$ts.p[, 2]), col = "blue")

##### deficit fiscal policy (Fig. 9.17; Fig. 9.18)
ge <- Example9.10(
  policy = Example9.10.policy.deficit.fiscal,
  priceAdjustmentVelocity = 0.5, ts = TRUE
)
plot(ge$ts.S[3, 3, ], type = "l")
plot(ge$ts.q[, 1], type = "l")

deficit.Example9.10 <- ge$policy.data
plot(deficit.Example9.10, type = "l")
plot(deficit.Example9.10[, 1], cumsum(deficit.Example9.10[, 2]), type = "l")
plot(deficit.Example9.10[, 1],
      cumsum(deficit.Example9.10[, 2]) /
      (tail(ge$ts.z[, 1] * ge$ts.p[, 1], -399)),
      type = "l"
)

##### tax policy (Fig. 9.16)
ge <- Example9.10(policy = Example9.10.policy.tax)
plot(ge$policy.data, type = "l")

```

Example9.10.policy.deficit.fiscal

Deficit Fiscal Policy for Example 9.10 in Li (2019)

Description

This is the deficit fiscal policy for the economy of Example 9.10 in Li (2019), which is discussed in Example 9.14.

Usage

Example9.10.policy.deficit.fiscal(time, state, state.history)

Arguments

| | |
|---------------|--|
| time | the current time. |
| state | a list indicating the current economic state including prices, activity levels and supplies. |
| state.history | the history of economic states. |

Value

Example9.10.policy.deficit.fiscal returns a list indicating the modified current economic state including prices, activity levels, supplies and current policy data.

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

See Also

[Example9.10](#); [Example9.10.policy.interest.rate](#); [Example9.10.policy.money.supply](#); [Example9.10.policy.deficit.fiscal](#); [Example9.10.policy.quantitative.easing](#); [Example9.10.policy.tax](#)

Example9.10.policy.deflation

Deflation Policy for Example9.10 in Li (2019)

Description

This is the deflation policy for the economy of Example 9.10 in Li (2019), which is discussed in Example 9.12.

Usage

Example9.10.policy.deflation(time, state, state.history)

Arguments

| | |
|---------------|--|
| time | the current time. |
| state | a list indicating the current economic state including prices, activity levels and supplies. |
| state.history | the history of economic states. |

Value

Example9.10.policy.deflation returns a list indicating the modified current economic state including prices, activity levels and supplies.

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

See Also

[Example9.10](#); [Example9.10.policy.interest.rate](#); [Example9.10.policy.money.supply](#); [Example9.10.policy.qua](#)
[Example9.10.policy.tax](#); [Example9.10.policy.deficit.fiscal](#)

Example9.10.policy.interest.rate

Interest Rate Policy for Example9.10 in Li (2019)

Description

This is the interest rate policy for the economy of Example 9.10 in Li (2019), which is discussed in Example 9.11.

Usage

Example9.10.policy.interest.rate(time, state, state.history)

Arguments

| | |
|---------------|--|
| time | the current time. |
| state | a list indicating the current economic state including prices, activity levels and supplies. |
| state.history | the history of economic states. |

Value

Example9.10.policy.interest.rate returns a list indicating the modified current economic state including prices, activity levels and supplies.

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

See Also

[Example9.10](#); [Example9.10.policy.money.supply](#); [Example9.10.policy.deflation](#); [Example9.10.policy.quantitative easing](#); [Example9.10.policy.tax](#); [Example9.10.policy.deficit.fiscal](#)

Example9.10.policy.money.supply

Money Supply Policy for Example9.10 in Li (2019)

Description

This is the money supply policy for the economy of Example 9.10 in Li (2019), which is discussed in Example 9.12.

Usage

Example9.10.policy.money.supply(time, state, state.history)

Arguments

| | |
|---------------|--|
| time | the current time. |
| state | a list indicating the current economic state including prices, activity levels and supplies. |
| state.history | the history of economic states. |

Value

Example9.10.policy.money.supply returns a list indicating the modified current economic state including prices, activity levels and supplies.

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

See Also

[Example9.10](#); [Example9.10.policy.interest.rate](#); [Example9.10.policy.deflation](#); [Example9.10.policy.quantitative easing](#); [Example9.10.policy.tax](#); [Example9.10.policy.deficit.fiscal](#)

Example9.10.policy.quantitative.easing

Quantitative Easing Policy for Example 9.10 in Li (2019)

Description

This is the deflation policy for the economy of Example 9.10 in Li (2019), which is discussed in Example 9.12.

Usage

```
Example9.10.policy.quantitative.easing(time, state, state.history)
```

Arguments

| | |
|---------------|--|
| time | the current time. |
| state | a list indicating the current economic state including prices, activity levels and supplies. |
| state.history | the history of economic states. |

Value

Example9.10.policy.quantitative.easing returns a list indicating the modified current economic state including prices, activity levels and supplies.

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

See Also

[Example9.10](#); [Example9.10.policy.interest.rate](#); [Example9.10.policy.money.supply](#); [Example9.10.policy.def](#)
[Example9.10.policy.tax](#); [Example9.10.policy.deficit.fiscal](#)

Example9.10.policy.tax

Tax Policy for Example9.10 in Li (2019)

Description

This is the tax policy for the economy of Example 9.10 in Li (2019), which is discussed in Example 9.13.

Usage

```
Example9.10.policy.tax(time, state, state.history)
```

Arguments

| | |
|---------------|--|
| time | the current time. |
| state | a list indicating the current economic state including prices, activity levels and supplies. |
| state.history | the history of economic states. |

Value

Example9.10.policy.tax returns a list indicating the modified current economic state including prices, activity levels, supplies and current policy data.

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

See Also

[Example9.10](#); [Example9.10.policy.interest.rate](#); [Example9.10.policy.money.supply](#); [Example9.10.policy.deficit.fiscal](#); [Example9.10.policy.quantitative.easing](#); [Example9.10.policy.deficit.fiscal](#)

Example9.3

Example 9.3 in Li (2019)

Description

This is Example 9.3 in Li (2019), which illustrates economic cycles in a pure production economy.

Usage

Example9.3()

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Examples

```
ge<-Example9.3()
matplot(ge$ts.p, type="l")
matplot(ge$ts.z, type="l")
```

Example9.4

Example 9.4 in Li (2019)

Description

This is Example 9.4 in Li (2019), which illustrates economic cycles in a corn economy.

Usage

Example9.4()

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Examples

```
ge<-Example9.4()
matplot(ge$ts.p, type="l")
matplot(ge$ts.z, type="l")
```

Example9.5

Example 9.5 in Li (2019)

Description

This is Example 9.5 in Li (2019), which illustrates the price-control equilibrium.

Usage

```
Example9.5()
```

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Examples

```
ge<-Example9.5()
matplot(ge$ts.p, type="l")
matplot(ge$ts.z, type="l")
```

Example9.6

Example 9.6 in Li (2019)

Description

This is Example 9.6 in Li (2019), which illustrates the technological progress and capital accumulation in the corn economy.

Usage

```
Example9.6()
```

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Examples

```
ge<-Example9.6()  
matplot(ge$ts.p)  
matplot(ge$ts.z)
```

Example9.7

Example 9.7 in Li (2019)

Description

This is Example 9.7 in Li (2019), which illustrates fixed assets and economic cycles.

Usage

```
Example9.7()
```

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Examples

```
ge<-Example9.7()  
matplot(ge$ts.p)  
matplot(ge$ts.z)
```

F_Z

*Exchange Function***Description**

Given a price vector, a demand structure matrix and a supply matrix, this function computes the (disequilibrium) exchange results of an exchange process. There are n commodities and m agents in the exchange process.

Usage

```
F_Z(A, p, S)
```

Arguments

| | |
|---|-----------------------------------|
| A | a n-by-m demand structure matrix. |
| p | a price n-vector. |
| S | a n-by-m supply matrix. |

Value

F_Z returns a list containing the following components:

| | |
|---|------------------------------|
| z | an exchange amount m-vector. |
| q | a sales rate n-vector. |

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Examples

```
A<-matrix(c(0.05, 0.05, 0.1,
            0.1, 0, 0.1,
            0, 0.15, 0.05),3,3,TRUE)
S<-diag(3)

#a market-clearing price vector
p<-c(0.6,0.9,1)
result<-F_Z(A,p,S)
#Each sales rate is equal to 1
result$q
#the purchase matrix
```

```
A%*%diag(result$z)

#a non-market-clearing price vector
p<-c(1,1,1)
result<-F_Z(A,p,S)
#Some sales rates don't equal 1
result$q
#the purchase matrix
A%*%diag(result$z)
```

Leontief_mA

Leontief Monetary Demand Structure Matrix

Description

This function computes a Leontief monetary demand structure matrix in a monetary economy.

Usage

```
Leontief_mA(A, p)
```

Arguments

A a numeric n-by-m matrix.
p a nonnegative numeric n-vector or n-by-1 matrix.

Details

Some elements of A corresponding to money equal -1.

Value

A n-by-m matrix is computed which indicates the (monetary) demand structure of agents (firms or consumers) with Leontief production functions or utility functions under the price vector p.

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

Examples

```
A<-matrix(c(0.5, 1, 1,
            0.1, 0, 0,
            -1, -1, -1),3,3,TRUE)
p<-1:3
Leontief_mA(A,p)
```

PF_eig*P-F (i.e. Perron-Frobenius) Eigenvalue and Eigenvector*

Description

This function computes the P-F (i.e. Perron-Frobenius) eigenvalue and eigenvector of an indecomposable nonnegative square matrix.

Usage

```
PF_eig(M)
```

Arguments

M an indecomposable nonnegative square matrix.

Value

PF_eig returns a list containing the following components:

val the P-F eigenvalue of M.
vec the normalized P-F eigenvector of M.

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

Horn, R. A., Johnson, C. R. (2012, ISBN: 0521548233) Matrix Analysis. Cambridge University Press.

Examples

```
M<-matrix(c(0.5,1,
            1, 0),2,2,TRUE)
PF_eig(M)
```

sdm

*Structural Dynamic Model (alias Structural Growth Model)***Description**

This function computes the general equilibrium and simulates the economic dynamics. The key part of this function is an exchange function (see [F_Z](#)), which is expounded in Li (2010, 2019).

Usage

```
sdm(
  A,
  B = diag(nrow(A)),
  n = nrow(B),
  m = ncol(B),
  S0Exg = matrix(NA, n, m),
  p0 = matrix(1, nrow = n, ncol = 1),
  z0 = matrix(100, nrow = m, ncol = 1),
  GRExg = NA,
  moneyOwnerIndex = NULL,
  moneyIndex = NULL,
  pExg = NULL,
  tolCond = 1e-5,
  maxIteration = 200,
  numberOfPeriods = 300,
  depreciationCoef = 0.8,
  thresholdForPriceAdjustment = 0.99,
  priceAdjustmentMethod = "variable",
  priceAdjustmentVelocity = 0.15,
  priceAdjustmentVelocityCoefficient = 0.95,
  substitutionMethod = "finalValue",
  trace = TRUE,
  ts = FALSE,
  policy = NULL,
  exchangeFunction = F_Z
)
```

Arguments

| | |
|---|--|
| A | a demand structure n-by-m matrix (or a function which returns an n-by-m matrix). |
| B | a supply structure n-by-m matrix (or a function which returns an n-by-m matrix). If (i,j)-th element of S0Exg is not NA, the value of the (i,j)-th element of B will be useless and ignored. |
| n | the number of commodities. |
| m | the number of economic agents (or sectors). |

| | |
|------------------------------------|---|
| S0Exg | an initial exogenous supply n-by-m matrix. |
| p0 | an initial price n-vector. |
| z0 | an initial activity level (or production level) m-vector. |
| GRExg | an exogenous growth rate. |
| moneyOwnerIndex | a vector consisting of the indices of agents supplying money. |
| moneyIndex | a vector consisting of the commodity indices of all types of money. |
| pExg | an n-vector indicating the exogenous prices (if any). |
| tolCond | the tolerance condition. |
| maxIteration | the maximum iteration count. |
| numberOfPeriods | the period number in each iteration. |
| depreciationCoef | the depreciation coefficient. |
| thresholdForPriceAdjustment | the threshold for price adjustment. |
| priceAdjustmentMethod | the price adjustment method. |
| priceAdjustmentVelocity | the price adjustment velocity. |
| priceAdjustmentVelocityCoefficient | the changing coefficient of the price adjustment velocity. |
| substitutionMethod | the substitution method for iterations. |
| trace | if TRUE, information is printed during the running of sdm. |
| ts | if TRUE, the time series of the last iteration are returned. |
| policy | a policy function. |
| exchangeFunction | the exchange function. |

Value

sdm returns a list containing the following components:

| | |
|------------|--|
| tolerance | the tolerance of the results. |
| p | equilibrium prices. |
| z | equilibrium activities. |
| S | equilibrium supply matrix at the initial period. |
| e | equilibrium foreign exchange rates in a multi-money economy. |
| growthRate | the endogenous equilibrium growth rate in a pure production economy. |
| A | the equilibrium demand structure matrix. |
| B | If B is a function, the equilibrium supply structure matrix is returned. |

| | |
|-------------|--|
| ts.p | the time series of prices in the last iteration. |
| ts.z | the time series of activity levels in the last iteration. |
| ts.S | the time series of supply matrix in the last iteration. |
| ts.q | the time series of sales rates in the last iteration. |
| ts.e | the time series of foreign exchange rates in the last iteration. |
| policy.data | the policy data. |

Author(s)

LI Wu <liwu@staff.shu.edu.cn>

References

LI Wu (2019, ISBN: 9787521804225) General Equilibrium and Structural Dynamics: Perspectives of New Structural Economics. Beijing: Economic Science Press. (In Chinese)

LI Wu (2010) A Structural Growth Model and its Applications to Sraffa's System. <http://www.iioa.org/conferences/18th/paper>

Varian, Hal R. (1992, ISBN: 0393957357). Microeconomic Analysis. W. W. Norton & Company.

See Also

Example2.2; Example2.3; Example . Section. 3.1.2.corn; Example3.1; Example3.2; Example3.4; Example3.8; Example3.9; Example3.10; Example3.12; Example3.14; Example4.2; Example4.8; Example4.9; Example4.10; Example4.11.1; Example4.11.2; Example4.12; Example4.13; Example4.15; Example4.16; Example5.1; Example5.2; Example5.3.2; Example5.4; Example5.5; Example5.6; Example5.10; Example5.11.1; Example5.11.2; Example6.2.1; Example6.2.2; Example6.3; Example6.4; Example6.5; Example6.6.1; Example6.6.2; Example6.6.3; Example6.7; Example6.9; Example6.10; Example6.11; Example6.13; Example7.1; Example7.2; Example7.3; Example7.4; Example7.5.1; Example7.5.2; Example7.6; Example7.7; Example7.8; Example7.9X; Example7.10; Example7.10.2; Example7.11; Example7.12; Example7.13; Example7.14; Example7.15; Example8.1; Example8.2; Example8.7; Example8.8; Example8.9; Example9.3; Example9.4; Example9.5; Example9.6; Example9.7; Example9.10;

Examples

```
## the example on page 352 in Varian (1992)
ge <- sdm(
  A = function(state) {
    a <- 0.5

    alpha <- rep(1, 3)
    Beta <- matrix(c(0, a, a,
                    0.5, 0, 0,
                    0.5, 1 - a, 1 - a), 3, 3, TRUE)

    #demand structure matrix (alias demand coefficient matrix).
    CD_A(alpha, Beta, state$p)
  },
  B = diag(3),
```

```
S0Exg = matrix(c(NA, NA, NA,  
                NA, 1, NA,  
                NA, NA, 1), 3, 3, TRUE),  
GRExg = 0,  
tolCond = 1e-10  
)  
ge$p/ge$p[1]
```


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