1   *

املستخلص

(Genetic Algorithm)

(Lagrange method) ,

.

One of Intelligence Techniques Usage to Solve some Economic Models

Abstract

The research, used the genetic algorithm as one of intelligence research techniques to find the least cost of constrained economic case for which Lagrange method is used to solve. The researcher suggested a new genetic algorithm to solve this type of economic cases and find the least possible cost as well as the critical values which made this cost the least possible one.

Keywords: Genetic Algorithm; Optimization; Economic Model; Lagrange method

1- **Introduction** :

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'   '

'

.[Dixit.1990]

(EM) (Economic   Model)

'

'   (

Structural   )

(Equations   :

'

(EM)

'   (1)   ]
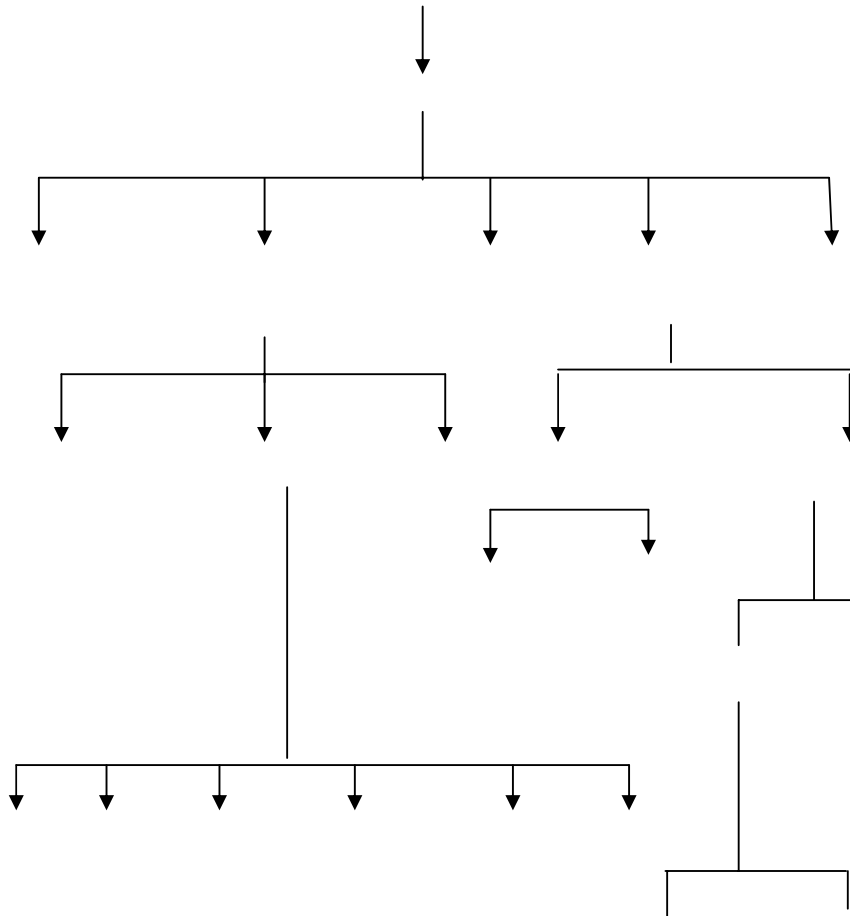
.[2004

(1)

(Economically Optimal Production)

,

,

Q   . [1993 ,   ]

:   ,   ,

$$Q = (KL)^{1/\theta}$$

[Dixit, θ ,   L   K

. 1990]

'

'

(1000)   Q1,Q2

:

$$Q1 + Q2 = 1000$$

'

] (Constrained Optimization Problems)

.[1993 ,

'

, (Lagrange method)

'

.[2004 ,   ]

, (λ)   '

'

,[Aliprantis and Chakrabart 1998]

:

$$2LK = 300$$

3 = ،   4 = ،

.300

:

$C = 3L + 4K$ .... (1)

$2LK = 300$

$Q = 3L + 4K + (2LK - 300)\ \lambda$

:

$\lambda = -0.142$ L = 14.14 , K = 10.6 ,

C   (1) :

$C = 3(14.14) + 4(10.6) = 84.8$

[1993 ،].

-2   (Genetic Algorithm):

،

. [GEN,2000]   (GA)   ]

[Sivanaudom & Deepa,2008]:

1.   (Search Space):

.

2. (Individual): ( )،

3. (Genes) : (GA)

4. (Population):

:

-

-

5. (Reporduction)، :

- (Crossover).

- (Mutation).

6. (Fitness   function) :

7. (Selection) :

8. (Stoppig Criteria):

(GA) 1975 ( )

( )،

[Rutkowski and Scherer.etc.,2010]:

1. (Optimization): (GA)

،

، ،

.

2. (Economic Models)؛

(GA)

3. (Decision Making) :

(GA)

.

4. (Neural Network Design) :

(GA).

(GA)

Risto) (Franklin Allen)   1993

(Karjalainen

Herbert)   1998

(Michael Kope)   (Dawid

2000   (Sylvie Geisendorf)

Alfons)   (   )

(Kathrin Happe)   (Balmann

2003

(Feryal Erhun)   (Pmar Keskinocak)

(GA)

2010

(GA)   .

‚

.

3-

:

(Steps of the Proposed GA for finding the Optimal solution for some Constrained Economic Problems):

(GA)

:   ‚

•   (Initial Data):

:

A :

B :

C :

2.   (Initial Generation) :

‚   ‚

.

3.   (Fitness Value) :

)

(.

(MATLAB) [Pascal and Michael

, 2009]   (

Toolbox)   (GA)   (MATLAB7)

)   (

‚

(   )

.

-4   **:(Experimental Part)**

,   :

-1   ,   (x)

(y) $ (2x²+50.000)

)   , $ (y²+40.000)

(1200   ,

[Aliprantis & Chakrabart,1998]

:

C = λ = -1600 , x = 400 , y = 800

1.050.000$

,   )   ,

,   (:

(Remainder)

(Heuristic)

(Gaussian)

(315)   (250.000) :

C = λ = -5.38   , x = 399.88   , y = 800.12

1.050.000 $

x   ,   ,

.   y

:   y   x   **-2**

$$C = 8x^2 - xy + 12y^2$$

أن هذه الشركة قد وقعت عقدا بـان تنـتج 42 وحدة من السلعتين , أي أن القيـد الـذي تواجهه الشركة 42 = y + x , المطلـوب إيجـاد القيم الحرجـة التـي تجعل تكـاليف هذه الشركة أدنى ما يمكن ضمن القيد الذي تواجهـه [السيفو وزكيـة , 2004]. وكانت

:

C = λ = 383 , x = 25 , y = 17

8043 $

,   )   ,

:   , (,

(Stochastic uniform)

(Heuristic)

(Gaussian)

(60.000.000)

:   (51)

$$\lambda = 0.457 \ , \ x = 25 \ , \ y = 17$$

$$C = 8043 \ \$$$

5-   :

.1   (GA)

.

.2

(GA) ,   .

.3   (GA)   )

(,   ,

.

6-   :

.1

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. 2

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References :

-                          :

-1   ,

-.   .   ,   , 2004.

2-   ,   ,   .

-.   ,   , 1993 .

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