Chance Constrained Fuzzy Goal Programming in Regression Model

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1.Introduction

Basing on a goal programming technique for developing a regression model needs to use fuzzy when impreciseness occurs. When we assume that the parameters of the model are random variables, to reach the deterministic structure which is same as this probability structure, we use the goal programming technique with chance constraints which is one of the special stochastic programming. In this study we decide to approach the regression model with the chance constraints fuzzy goal programming.

2. Goal Programming Chance Constraints

The decision maker who has to solve more than one goal which are contradictory each other, follows two approaches to get the optimal solution system; the decision maker can minimize or maximize the utility function. In this situation to solve and analyze the problems which are includes more than one objective function goal programming technique has developed. Goal programming coefficients named as deterministic, stochastic, fuzzy goal programming according to their properties. When all the parameters or some parameters of the model are random variables, programming technique with chance constraints, a special stochastic programming technique [1,4]. According to these definitions, the goal programming model with chance constraints as follows,

$$G_{enk} = Enk\{P_1 h_1(d_i^-, d_i^+), \ldots, P_i h_i(d_i^-, d_i^+)$$

$$P(g_i(x) + d_i^- - d_i^+ = b_i) \geq \alpha$$

$$P(f_j(x) + d_i^+ - d_i^- = b_j) \geq \alpha$$

$$x, d^-, d^+ \geq 0$$

In this model

h_i : arrival function for i th goal

P_i : priority related with i th goal

d_i^- : negative deviation total from i th goal

d_i^+ : positive deviation total from i th goal

$f_j(x)$: decision variables function for j th objective

b_j : right hand side value for j th objective function

$g_i(x)$: decision variable function related with i th constraint

b_i :right hand side value for i. constraint

á: :meaning level

x :decision variable

In this technique, the purpose is to convert the probability structured problem to deterministic state which is same without changing the base structure. Here á is between 0 and;

$$P\{\sum_{i=1}^{n} a_{ij} x_j \le b_i\} \ge a_i \qquad i = 1,2,\ldots,m \qquad (1)$$

the constraint given with (1) ;

$$\sum_{i=1}^{n} a_{ij} x_j \le m_i + Z_{a_i} s_i \qquad i = 1,2,\ldots,m$$

m_i : expecting value of b_i

s_i : standard deviation of b_i

can be linear [3,6].

3. Fuzzy Goal Programming

In real world in many situations the goals and the objects of the decision maker are fuzzy. In fuzzy goal programming approach the goals are not certain. In several times it can be flexible for the decision makers to decide. The target which shows the uncertain goal values can be defined as fuzzy goals [2,5].In this model by using the triangular membership function, the goals can be defined as

$(Ax)_i \simeq B_i$

$(Ax)_i \simeq E(B_i) + Z_a \sqrt{Var(B_i)}$

$E(B_i)$: Expected value of B_i

$\sqrt{Var(B_i)}$: Standart Deviation of B_i

and by substituting to $Xb + e = Y$ regression model;

$Min \sum d_i^{-+}$

$(bX)_i \simeq Y$

$(bX)_i \simeq E(Y) + Z_a \sqrt{Var(Y)}$

can obtained.

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RESUME

Dans ce travaille, on determinera l' apprache de programme de but de fuzzy avec les chance constraits au model de regression.