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Preliminary Research on Aging Population and Flexible Retirement Policy of Shanghai

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Abstract

This paper predicts the trend for the population aged 60 and over the next years by using gray prediction model, using the gray GM (1,1) metabolism model predict the 60 years of age and older population will be increasing at least in the number of 150,000 per year from 2010 to 2015 in Shanghai. Introduce the policy of flexible retirement to measure the number of the elderly population who Reach retirement age but continued employment. Prove the policy' implementation has enormous favorable foundation.

Keywords: Metabolic GM(1,1)model; forcast elderly population; ageing population;Flexible Delay Retirement;

1. Preface

At present, population aging has become a common challenge faced by Countries around the world, with the fifth Population Census, China began to enter the ranks of countries with an aging population. Shanghai as the aging of the population above the national average large city, in response to population aging road faces more severe challenges. Shanghai aging of the population show the following three characteristics: First, the degree of population aging is much higher than the national average, has reached 21.6 percent in 2008.

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Second, because Shanghai has a better economic, health conditions, the average life expectancy greatly improve, making the average life expectancy of the aging population surpass the national average level. Third, in Shanghai there is a large-scale continuation of employment of the elderly group. Shanghai outstanding aging characteristics make great demand for health resources, the pension fund demand, therefore face enormous difficulties and distress in the process of coping with the population aging. At the same time, the average life expectancy raising level and the existence of retirement continue employment groups put forward new ideas in response to population aging. By introducing a flexible retirement age policy to ease the social pension insurance fund payment pressure, meet the practical needs of the population aging.

2. Forecast about the elderly population number of Shanghai

2.1. Build elderly population forecasting model

This article take the 60 years old and over population as the raw data to do Simulated prediction, the data which come from Shanghai Statistical Yearbook 2004-2010, as shown in Table 1.

Table 1.Shanghai aged 60 and over population number (unit: million)

years	2004	2005	2006	2007	2008	2009	2010
number	260.78	266.37	275.62	286.83	300.57	315.7	331.02

(1) 1-the AGO sequence of $X^{(0)}$

Set $X^{(0)}$ represent the total population of the original data sequence, its component represents the end of each year of the total population; population is increased by the original data sequence $X^{(0)}$ = （$X^{(0)}(1),X^{(0)}(2),\ldots X^{(0)}(n)$）, An additive to generate $X^{(0)}$, get the generated sequence: $X^{(1)}$ = （$X^{(1)}(1),X^{(1)}(2),\ldots X^{(1)}(n)$, which $x^{(1)}(k)=\sum_{i=1}^{k}x^{(0)}(i),k=1,2,3,4,5$

2004-2008 the original data sequence $X^{(0)}$ = （$x^{(0)}(1)$，$x^{(0)}(2)$，……，$x^{(0)}(n)$, once accumulated generating operation. Get 1- AGO sequence as shown in Table 2.

Table 2.1-the AGO sequence

years	2004	2005	2006	2007	2008
Gray sequence	2.6078	5.2715	8.0277	10.896	13.9017

(2) Do authentic smooth test for $X^{(0)}$，from

$$\rho(k)=\frac{x^{(0)}(k)}{x^{(1)}(k-1)} \quad (1)$$

get: $\rho(2)=1.02$ $\rho(3)=0.52$ $\rho(4)=0.36$ $\rho(5)=0.275$

(3) Inspect $X^{(1)}$ whether conform the Exponential law, from

$$\sigma^{(1)}(k)=\frac{x^{(1)}(k)}{x^{(1)}(k-1)} \quad (2)$$

get: $\sigma(1)(3)\approx1.52$ $\sigma(1)(4)\approx1.36$ $\sigma(1)(5)\approx1.28$

When k>5, $\sigma^{(1)}(K)\in[1,1.5]$, $\xi=0.5$，meeting the Quasi-exponentially, Therefore, can construct GM (1,1) model for $X^{(1)}$.