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INDUSTRY STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

MZ/T 093-2017

Specification for welfare-lottery system lottery-random-number-test

中国福利彩票系统彩票随机数检验规范

(English Translation)

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Foreword

This standard was drafted in accordance with the rules given in GB/T 1.1-2009.

This standard is proposed by the China Welfare Lottery Issuance Management Center.

This standard is under the administration of the Department of Social Welfare and Charity Promotion of the Ministry of Civil Affairs.

This standard was drafted. China Welfare Lottery Issuing Management Center.

1 Scope

This standard specifies the test method, test process and test results of the randomness of the random number sequence of the lottery in the China Welfare Lottery System.

set.

This standard is applicable to test institutions and testers for the random number sequence inspection of lottery in the China Welfare Lottery System.

2 Normative references

The clauses in the following documents become the clauses of this specification after being referenced. For dated references, all subsequent documents the amendments (excluding the content of errata) or revisions are not applicable to this specification, but parties who use this specification are encouraged to explore the use of the possibility of a new version. For undated references, the latest version applies to this specification.

MZ/T 079-2017 China Welfare Lottery System Software Test Specification GM/T 0005-2012 Randomness Test Specification

3 Terms and definitions

Lottery random number sequence A binary random number sequence used in the Chinese welfare lottery system. The natural numbers that make up the sequence are composed of 0 and 1 and are arranged continuously.

Column.

Randomness of lottery random number sequence the randomness of the lottery random number sequence indicates that it has unpredictability, uniformity, and measurability.

Unpredictability

No matter how many digits the lottery random number sequence has, and what number has been generated, the next number generated should be unpredictable.

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At the same time, it is not possible to deduce the seed using the numbers that have been generated.

Uniformity

On any single bit of the lottery random number sequence, the probability of appearing 0 or 1 is equal to 1/2.

Scalability

The test passed on the random number sequence of the lottery should get the same verification in the subsequence of the sequence.

Block

A continuous binary number in a lottery random number sequence starting from a certain digit.

Run

A sequence of consecutive bits with the same value, the bits before and after the run are different values or have no content.

Template

A sequence of binary numbers with a certain length established according to certain rules.

Linear feedback shift register, LFSR is a fixed-length sequence of numbers, where each digit is shifted right by the left or right digit of the number or it is shifted to the left, and the first or last digit is cycled to the last or first digit.

3.10

Significance level

Probability that a random sequence is incorrectly judged to be a non-random sequence in a randomness test.

4.1 Overview

Lottery random number sequence randomness test methods include ratio test, block-in-block ratio test, total runs test, run distribution test, Intra-block longest run test, binary matrix test, discrete Fourier transform test, poker test, overlapping template matching test, general system There are a total of fifteen test methods including calculation test, linear complexity test, approximate entropy test, cumulative sum test, binary derivation test and autocorrelation test.

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4.2 Proportional inspection

Check the proportion of the sum of the number of occurrences of 0 and 1 in the random number sequence of the lottery. The purpose of the test is to determine the random number sequence under test in the column, the proportion of the number of occurrences of each number should be close to 1/2.

The test method is to convert the 0 and 1 of the measured random number sequence into -1 and 1, respectively, and then calculate the result and compare it with the significance level.

4.3 Proportional Inspection in Blocks

Check the proportion of the number of occurrences of 0 and 1 in each block of the lottery random number sequence. The purpose of the test is to determine the random number under test in a subsequence of a word sequence, the ratio of the number of occurrences of 0 and 1 should be close to 1/2.

The test method is to divide the measured random number sequence into multiple non-overlapping subsequences, and count the proportion of 1 in each subsequence to calculate the result.

Results were compared with significance levels.

4.4 Total number of runs

Check whether the total number of runs in the random number sequence of the lottery obeys the randomness requirement.

The test method is to count the total number of runs of the random number sequence under test, and to count the proportion of the number of occurrences of 1 in the number sequence.

Compare with significance level.

4.5 Run length distribution test

Check the number of occurrences of each run in the random number sequence of the lottery. The purpose of the test is to determine the different lengths in the sequence of random numbers under test.

The degree to which the total number of runs corresponds to the expected value of the random sequence.

The test method is to count the length of each run in the measured random number sequence, record the number of runs, and calculate the sum of significance Compare levels.

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