New Principles of Measurement Scales Conversion of DAC and ADC on the Basis Attenuator-Divider Trotsyshyna

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Abstrakt - **Consider new ways of measuring conversion DAC and ADC on the basis of the quantum approach coincidence principles and their implementa-tion based on the attenuator-divider Trotsyshyna**

Keywords - **measuring conversion DAC and ADC, coincidence principles, attenuator-divider Trotsyshyna**

I. INTRODUCTION

Any modern system of information processing uses the DAC and ADC conversion are mandatory elements that connect the analog-s and digital tools and systems. Existing DAC and ADC built on the principles of binary arithmetic and divided into two groups: parallel and sequential, and used in accordance with the structure of divisors in R-2R (sequential), or Kelvin divider (parallel actions).

Axiom are those features that converters based R-2R number of points of the first binary scale transformation is defined as: $n_{R-2R} = 2^k$, where k – number of units R-2R, or for 16 R-2R matrix: $n_{R-2R} = 2^k = 65536 \approx 64k$.

II. THE MAIN PART

For Kelvin divider with N_R consistently included resistors of equal value: $n_{Kelvin} = N_R$, or N=256 resistors - $n_{Kelvin} = 256$. Value $k = 16 (n_{R-2R} = 65k)$ i $N = 256 (n_{Kelvin} = 256)$ are practical limits define the range of scales under serial and parallel conversion, and gave rise to the postulate that the accuracy of product performance (resolution = 1/n scale) is constant. So for the R-2R-technically impossible to provide better accuracy deviation denominations $d \le 1/2^{15} \approx 0{,}03\%$, and noise divider. For Kelvin divider, dividing factor equal to N, and junior level is at the level of noise when N> 256, besides the number of precision resistors in 512 or 1024 technology outside of integrated circuits. Rational way out of the impasse created specified postulate – accuracy*speed = constant, is to use the principles of quantum theory of measurement conversion (KTMC), which most clearly shows a attenuator-divider Trotsyshyna (ADT) Figure 1 [1].

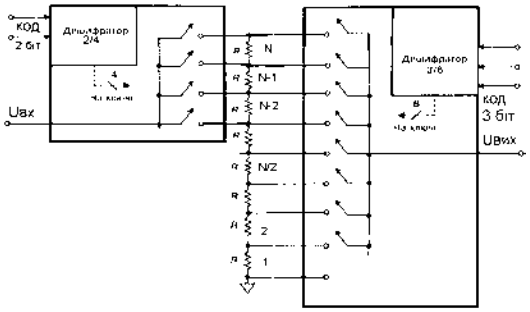

Fig. 1. Attenuator-divider Trotsyshyna (ADT_8R)

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So for ADT_8R, characteristic transformation with n = 22 points will look like Figure 2.

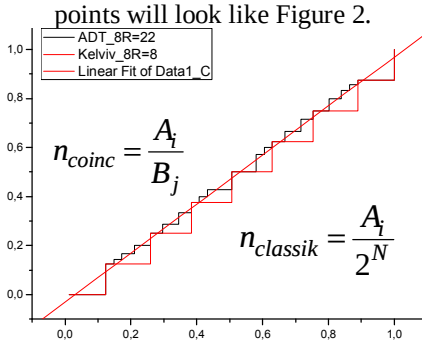

Fig.2. Comparison of scales and classical transformation ADT

At the same time Kelvin divider provides the transfer characteristic Kelvin = 8. Analytical models of these transformations is given in Figure 2.

Particularly impressive results give Apt modifications that were named (super, delta-sigma, combi)

$n_{super\_8} = 166,\ n_{D\_S\_8} = 169,\ n_{comby\_8} = 247,$

characteristics shown in Figure 3, together with models.

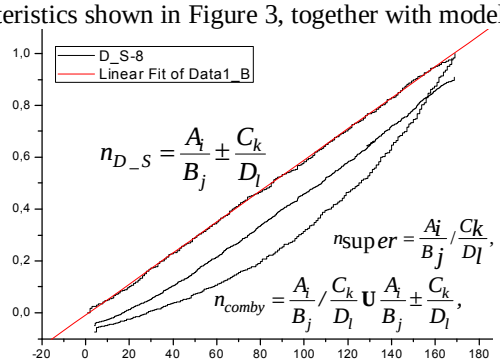

Fig.3 Comparison of scale transformations

III. CONCLUSIONS

Using the principles KTMC using ADT, enables to increase the speed and accuracy and DAC and ADC, as compared with the binary in (for the method coincidence) or even (for delta-sigma, super, combi). As a result of practical application FLESH_256 be implemented by only two APT_10R, and the resolution to provide only two APT_64R that can not be achieved any other way.

REFERENCES

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