

A New Steering Strategy for UTC(NTSC)

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A new steering strategy is used to monitor UTC(NTSC) in this paper, the goal of the steering strategy for UTC(NTSC) is intended to minimize the time difference between UTC(NTSC) and UTC, and not largely effect the performance of the master clock.

Firstly, a stable reference time scale TA'(NTSC) for real-time monitoring UTC(NTSC) is introduced. The timescale algorithm generating TA'(NTSC) base on ALGOS algorithm, which is computed as a weighted average of about 22 free-running atomic clocks at NTSC and weighting procedure has been designed to optimize the short-term frequency stability of the scale. TA'(NTSC) is the optimal and important atomic time scale for monitoring UTC (NTSC).

Secondly, the new steering strategy are discussed, The detailed algorithm is as follows:

1) predict the frequency of the maser clock in next time interval, calculate the frequency prediction value of the phase difference between TA'(NTSC) and the master clock. In other words, UTC (NTSC) is consistent with TA' (NTSC) in frequency.

2) compensate the frequency difference between TA'(NTSC) and UTC (NTSC).

3) estimate the possible frequency difference between UTC(NTSC) and UTCr .

4) estimate the possible difference between UTC(NTSC) and UTC.

The final frequency offset is generated on the basis of 1), 2), 3), 4), The derived frequency offset is sent to the micro phase stepper.

Finally, the results of real steering UTC(NTSC) in 2013.09~2013.12 are discussed, and Fig.1 shows that new master clock steering strategy can control the phase offset within , and table.1 shows that new master clock steering strategy can improve short-term stability as well as long-term stability.

Fig. 1: UTC-UTC(NTSC)

Table 1 Allan deviations of UTC(NTSC), the reference is UTC

averaging time/d	ADEV(2013.9~2013.12)
5	6.16E-15
10	3.32E-15
15	2.00E-15
20	1.81E-15
25	1.19E-15

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