Package 'LowWAFOMNX'

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Type Package

Title Low WAFOM Niederreiter-Xing Sequence

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Description Implementation of Low Walsh Figure of Merit (WAFOM) sequence based on Niederreiter-Xing sequence <DOI:10.1007/978-3-642-56046-0_30>.

URL https://mersennetwister-lab.github.io/LowWAFOMNX/

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Imports Rcpp (>= 0.12.9), RSQLite (>= 2.0)

LinkingTo Rcpp

Suggests knitr, rmarkdown, testthat

VignetteBuilder knitr

RoxygenNote 6.0.1

NeedsCompilation yes

Repository CRAN

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Contents

LowWAFOMNX-package *Low WAFOM Niederreiter-Xing Sequence*

Description

Description: R implementation of Low Walsh Figure of Merit Sequence based on Niederreiter-Xing Sequence.

Details

Porting to R by Mutsuo Saito. The R version does not return coordinate value zero, but returns value very near to zero, 2^-64.

Acknowledgment

The development of this code is partially supported by JST CREST.

Reference

* Shinsuke Mori, "Suuchi Sekibun no tameno QMC Ten Shuugou no Sekkei, Tansaku, oyobi sono Yuukousei", Master's Thesis, 2017, * Ryuichi Ohori, "Efficient Quasi Monte Carlo Integration by Adjusting the Derivation-sensitivity Parameter of Walsh Figure of Merit", Master's Thesis, 2015. * S. Harase and R. Ohori, "A search for extensible low-WAFOM point sets", arXiv preprint, arXiv:1309.7828, (2013), https://arxiv.org/abs/1309.7828. * Harase, S. (2016). "A search for extensible low-WAFOM point sets", Monte Carlo Methods and Applications, 22(4), pp. 349-357, 2017. * M. Matsumoto and R. Ohori, "Walsh Figure of Merit for Digital Nets: An Easy Measure for Higher Order Convergent QMC", Springer International Publishing, Cham, 2016, pp. 143-160. * M. Matsumoto, M. Saito, and K. Matoba, "A computable figure of merit for quasi-Monte Carlo point sets", Mathematics of Computation, 83 (2014), pp. 1233-1250. * G. Pirsic, "A software implementation of Niederreiter-Xing sequences", in Monte Carlo and Quasi-Monte Carlo Methods 2000, Springer, 2002, pp. 434-445. https://sites.google.com/site/isabelpirsic/nxlegacy. * C. P. Xing and H. Niederreiter, "A construction of low-discrepancy sequences using global function fields", ACTA ARITHMETICA, 73 (1995), pp. 87-102.

Examples

```
srange <- lowWAFOMNX.dimMinMax()
mrange <- lowWAFOMNX.dimF2MinMax(srange[1])
points <- lowWAFOMNX.points(dimR=srange[1], dimF2=mrange[1])
points <- lowWAFOMNX.points(dimR=srange[1], dimF2=mrange[1], digitalShift=TRUE)
```

lowWAFOMNX.dimF2MinMax *get minimum and maximum F2 dimension number.*

Description

get minimum and maximum F2 dimension number.

Usage

```
lowWAFOMNX.dimF2MinMax(dimR)
```

Arguments

dimR	dimention.

Value

supported minimum and maximum F2 dimension number

lowWAFOMNX.dimMinMax *get minimum and maximum dimension number of Low WAFOM Niederreiter-Xing Sequence*

Description

get minimum and maximum dimension number of Low WAFOM Niederreiter-Xing Sequence

Usage

```
lowWAFOMNX.dimMinMax()
```

Value

supported minimum and maximum dimension number.

`lowWAFOMNX.points` *get points from Low WAFOM Niederreiter-XingSobolSequence*

Description

This R version does not returns coordinate value zero, but returns value very near to zero, 2^-64.

Usage

```
lowWAFOMNX.points(dimR, dimF2 = 10, digitalShift = FALSE)
```

Arguments

`dimR`	dimension.
`dimF2`	F2-dimension of each element.
`digitalShift`	use digital shift or not.

Value

matrix of points where every row contains dimR dimensional point.

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