

# Package ‘LowWAFOMSobol’

August 29, 2017

**Type** Package

**Title** Low WAFOM Sobol Sequence

**Version** 1.1.1

**Date** 2017-08-21

**Author** Shinsuke Mori [aut],  
Ryuichi Ohori [aut],  
Makoto Matsumoto [aut],  
Mutsuo Saito [cre]

**Maintainer** Mutsuo Saito <sai10@hiroshima-u.ac.jp>

**Description** Implementation of Low Walsh Figure of Merit (WAFOM) sequence based on Sobol sequence.

**URL** <https://mersennetwister-lab.github.io/LowWAFOMSobol/>

**License** BSD\_3\_clause + file LICENSE

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

**LinkingTo** Rcpp

**Suggests** knitr, rmarkdown, testthat

**VignetteBuilder** knitr

**RoxygenNote** 6.0.1

**NeedsCompilation** yes

**Repository** CRAN

**Date/Publication** 2017-08-29 11:53:32 UTC

## R topics documented:

LowWAFOMSobol-package . . . . .	2
lowWAFOMSobol.dimF2MinMax . . . . .	3
lowWAFOMSobol.dimMinMax . . . . .	3
lowWAFOMSobol.points . . . . .	4
<b>Index</b>	<b>5</b>

---

LowWAFOMSobol-package *Low WAFOM Sobol Sequence*

---

## Description

Description: R implementation of Low Walsh Figure of Merit (WAFOM) Sequence based on Sobol 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 tamenno 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. \* S. Joe and F. Y. Kuo, "Constructing Sobol sequences with better two-dimensional projections", SIAM J. Sci. Comput. 30, 2635-2654 (2008).

## Examples

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

---

lowWAFOMSobol.dimF2MinMax

*get minimum and maximum F2 dimension number.*

---

**Description**

get minimum and maximum F2 dimension number.

**Usage**

lowWAFOMSobol.dimF2MinMax(dimR)

**Arguments**

dimR            dimension.

**Value**

supported minimum and maximum F2 dimension number

---

lowWAFOMSobol.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**

lowWAFOMSobol.dimMinMax()

**Value**

supported minimum and maximum dimension number.

---

lowWAFOMSobol.points *get points from Low WAFOM SobolSequence*

---

**Description**

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

**Usage**

```
lowWAFOMSobol.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.

# Index

LowWAFOMSobol (LowWAFOMSobol-package), [2](#)  
LowWAFOMSobol-package, [2](#)  
lowWAFOMSobol.dimF2MinMax, [3](#)  
lowWAFOMSobol.dimMinMax, [3](#)  
lowWAFOMSobol.points, [4](#)