C interfaces to GALAHAD LHS

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Chapter 1

GALAHAD C package lhs

1.1 Introduction

1.1.1 Purpose

This package **computes an array of Latin Hypercube samples.**.

Currently, only the control and inform parameters are exposed; these are provided and used by other GALAHAD packages with C interfaces.

1.1.2 Authors

John Burkardt, 2003-2012, adapted for GALAHAD by N. I. M. Gould, STFC-Rutherford Appleton Laboratory, England.

C interface, additionally J. Fowkes, STFC-Rutherford Appleton Laboratory.

1.1.3 Originally released

June 2016, C interface March 2022.

Chapter 2

File Index

2.1 File List

Here is a list of all files with brief descriptions:

Chapter 3

File Documentation

3.1 lhs.h File Reference

```
#include <stdbool.h>
#include "galahad_precision.h"
```

Data Structures

- struct lhs_inform_type
- struct lhs_control_type

Functions

- void lhs_initialize (void **data, struct lhs_control_type *control, struct lhs_inform_type *inform)
- void lhs_read_specfile (struct lhs_control_type *control, const char specfile[ ])
- void lhs_ihs (int n_dimen, int n_points, int *seed, int X[n_dimen][n_points], const struct lhs_control_type *control, struct lhs_inform_type *inform, void **data)
- void lhs_get_seed (int *seed)
- void lhs_terminate (void **data, struct lhs_control_type *control, struct lhs_inform_type *inform)

3.1.1 Data Structure Documentation

3.1.1.1 struct lhs_inform_type

Data Fields

int	status	
int	alloc_status	
char	bad_alloc[81]	

3.1.1.2 struct lhs_control_type

Data Fields

int	error	
int	out	
int	print_level	
int	duplication	
bool	space_critical	
bool	deallocate_error_fatal	
char	prefix[31]	

3.1.2 Function Documentation

3.1.2.1 lhs_initialize()

```
void lhs_initialize (
             void ** data,
             struct lhs_control_type * control,
             struct lhs_inform_type * inform )
```

3.1.2.2 lhs_read_specfile()

```
void lhs_read_specfile (
             struct lhs_control_type * control,
             const char specfile[] )
```

3.1.2.3 lhs_ihs()

```
void lhs_ihs (
             int n_dimen,
             int n_points,
             int * seed,
             int X[n_dimen][n_points],
             const struct lhs_control_type * control,
             struct lhs_inform_type * inform,
             void ** data )
```

3.1.2.4 lhs_get_seed()

```
void lhs_get_seed (
             int * seed )
```

3.1.2.5 lhs_terminate()

```
void lhs_terminate (
             void ** data,
             struct lhs_control_type * control,
             struct lhs_inform_type * inform )
```

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