

# sInitial

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*Function to initialise a sInit object given a topology and input data*

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## Description

sInitial is supposed to initialise an object of class "sInit" given a topology and input data. As a matter of fact, it initialises the codebook matrix (in input high-dimensional space). The return object inherits the topology information (i.e., a "sTopol" object from sTopology), along with initialised codebook matrix and method used.

## Usage

```
sInitial(data, sTopol, init = c("linear", "uniform", "sample"))
```

## Arguments

|        |  |
|--------|--|
| data   | a data frame or matrix of input data   |
| sTopol | an object of class "sTopol" (see sTopology)  |
| init   | an initialisation method. It can be one of "uniform", "sample" and "linear" initialisation methods |

## Value

an object of class "sInit", a list with following components:

- nHex: the total number of hexagons/rectanges in the grid
- xdim: x-dimension of the grid
- ydim: y-dimension of the grid
- lattice: the grid lattice
- shape: the grid shape
- coord: a matrix of nHex x 2, with each row corresponding to the coordinates of a hexagon/rectangle in the 2D map grid
- init: an initialisation method
- codebook: a codebook matrix of nHex x ncol(data), with each row corresponding to a prototype vector in input high-dimensional space
- call: the call that produced this result

**Note**

The initialisation methods include:

- "uniform": the codebook matrix is uniformly initialised via randomly taking any values within the interval [min, max] of each column of input data
- "sample": the codebook matrix is initialised via randomly sampling/selecting input data
- "linear": the codebook matrix is linearly initialised along the first two greatest eigenvectors of input data

**See Also**

[sTopology](#)

**Examples**

```
# 1) generate an iid normal random matrix of 100x10
data <- matrix( rnorm(100*10,mean=0,sd=1), nrow=100, ncol=10)

# 2) from this input matrix, determine nHex=5*sqrt(nrow(data))=50,
# but it returns nHex=61, via "sHexGrid(nHex=50)", to make sure a supra-hexagonal grid
sTopol <- sTopology(data=data, lattice="hexa", shape="suprahex")

# 3) initialise the codebook matrix using different methods
# 3a) using "uniform" method
sI_uniform <- sInitial(data=data, sTopol=sTopol, init="uniform")
# 3b) using "sample" method
# sI_sample <- sInitial(data=data, sTopol=sTopol, init="sample")
# 3c) using "linear" method
# sI_linear <- sInitial(data=data, sTopol=sTopol, init="linear")
```