Scikit MIT Haystack Data Analysis Pipeline Toolkit

Generated by Doxygen 1.8.12

Contents

Chapter 1

Namespace Index

1.1 Packages

Here are the packages with brief descriptions (if available):

Chapter 2

Hierarchical Index

2.1 Class Hierarchy

This inheritance list is sorted roughly, but not completely, alphabetically:

Chapter 3

Class Index

3.1 Class List

Here are the classes, structs, unions and interfaces with brief descriptions:

Chapter 4

File Index

4.1 File List

Here is a list of all files with brief descriptions:

Chapter 5

Namespace Documentation

5.1 AlgoParam Namespace Reference

5.1.1 Detailed Description

Provides tunable parameter classes for use in the Computer-Aided Discovery pipeline.

5.2 skdiscovery Namespace Reference

Namespaces

- framework
- generic
- series
- table
- utilities
- visualization

5.3 skdiscovery.framework Namespace Reference

Namespaces

- base
- discoverypipeline
- param
- stagecontainers

5.4 skdiscovery.framework.base Namespace Reference

Classes

- class PipelineItem

5.5 skdiscovery.framework.discoverypipeline Namespace Reference

Classes

- class DiscoveryPipeline

5.6 skdiscovery.framework.param Namespace Reference

Classes

- class AutoList
- class AutoListCycle
- class AutoListPermute
- class AutoListRemove
- class AutoListSubset
- class AutoParam
- class AutoParamList
- class AutoParamListCycle
- class AutoParamMinMax
- class AutoParamMinMaxExtreme

5.7 skdiscovery.framework.stagecontainers Namespace Reference

Classes

- class StageContainer
- class StageContainerAlternative
- class StageContainerIncrementalAdd

5.8 skdiscovery.generic Namespace Reference

Namespaces

- accumulators

5.9 skdiscovery.generic.accumulators Namespace Reference

Namespaces

- data
- gpshplotter
- hcluster

5.10 skdiscovery.generic.accumulators.data Namespace Reference

Classes

- class DataAccumulator

5.11 skdiscovery.generic.accumulators.gpshplotter Namespace Reference

Classes

- class GPSHPlotter

5.12 skdiscovery.generic.accumulators.hcluster Namespace Reference

Classes

- class HCluster

5.13 skdiscovery.series Namespace Reference

Namespaces

- accumulators
- analysis
- filters

5.14 skdiscovery.series.accumulators Namespace Reference

Namespaces

- plotter

5.15 skdiscovery.series.accumulators.plotter Namespace Reference

Classes

- class Plotter

5.16 skdiscovery.series.analysis Namespace Reference

Namespaces

- correlate
- gca
- mogi

5.17 skdiscovery.series.analysis.correlate Namespace Reference

Classes

- class Correlate

5.18 skdiscovery.series.analysis.gca Namespace Reference

Classes

- class General_Component_Analysis

5.19 skdiscovery.series.analysis.mogi Namespace Reference

Classes

- class Mogi_Inversion

Functions

- def MogiVectors (mogi_res, station_lat_list, station_lon_list, flag3D=False)

5.19.1 Function Documentation

5.19.1.1 MogiVectors()

```
def skdiscovery.series.analysis.MogiVectors (
              mogi_res,
              station_lat_list,
              station_lon_list,
              flag3D = False )
```

Creates a set of Mogi vectors for plotting.

Parameters

mogi_res	Magma source inversion results
station_lat_list	List of station latitudes
station_lon_list	List of station longitudes
flag3D	Flag for generating 3 dimensional vectors instead of only horizontal

Returns

x and y Mogi vectors scaled by pca amplitude change

5.20 skdiscovery.series.filters Namespace Reference

Namespaces

- dataremover
- hyperbolictan
- interpolate
- kalman
- lowpass
- median
- offset_detrend
- trend

5.21 skdiscovery.series.filters.dataremover Namespace Reference

Classes

- class DataRemover

5.22 skdiscovery.series.filters.hyperbolictan Namespace Reference

Classes

- class HTanFilter

5.23 skdiscovery.series.filters.interpolate Namespace Reference

Classes

- class InterpolateFilter

5.24 skdiscovery.series.filters.kalman Namespace Reference

Classes

- class KalmanFilter

5.25 skdiscovery.series.filters.lowpass Namespace Reference

Classes

- class LowPassFilter

5.26 skdiscovery.series.filters.median Namespace Reference

Classes

- class MedianFilter

5.27 skdiscovery.series.filters.offset_detrend Namespace Reference

Classes

- class OffsetDetrend

5.28 skdiscovery.series.filters.trend Namespace Reference

Classes

- class TrendFilter

5.29 skdiscovery.table Namespace Reference

Namespaces

- accumulators
- analysis
- filters
- fusion
- generators

5.30 skdiscovery.table.accumulators Namespace Reference

Namespaces

- plotter

5.31 skdiscovery.table.accumulators.plotter Namespace Reference

Classes

- class Plotter

5.32 skdiscovery.table.analysis Namespace Reference

Namespaces

- correlate
- dbscan
- gca
- midas
- mogi
- outlier
- skew
- vdbscan

5.33 skdiscovery.table.analysis.correlate Namespace Reference

Classes

- class Correlate

5.34 skdiscovery.table.analysis.dbscan Namespace Reference

Classes

- class DBScan

5.35 skdiscovery.table.analysis.gca Namespace Reference

Classes

- class General_Component_Analysis

5.36 skdiscovery.table.analysis.midas Namespace Reference

Classes

- class MIDAS

5.37 skdiscovery.table.analysis.mogi Namespace Reference

Classes

- class Mogi_Inversion

Functions

- def MogiVectors (mogi_res, station_lat_list, station_lon_list, flag3D=False)

5.37.1 Function Documentation

5.37.1.1 MogiVectors()

```
def skdiscovery.table.analysis.MogiVectors (
              mogi_res,
              station_lat_list,
              station_lon_list,
              flag3D = False )
```

Creates a set of mogi vectors for plotting.

Parameters

mogi_res	Magma source
station_lat_list	List of station latitudes
station_lon_list	List of station longitudes
flag3D	Make vectors 3 dimensional, defaults to False (2D)

5.38 skdiscovery.table.analysis.outlier Namespace Reference

Classes

- class Outlier

5.39 skdiscovery.table.analysis.skew Namespace Reference

Classes

- class Skew

5.40 skdiscovery.table.analysis.vdbscan Namespace Reference

Classes

- class VDBScan

5.41 skdiscovery.table.filters Namespace Reference

Namespaces

- antenna_offset
- calibrate_grace
- combine_columns
- dataremover
- geolocation
- hyperbolictan
- interpolate
- kalman
- lowpass
- median
- offset_detrend
- propagate_nans
- snow_remover
- stabilization
- table_filter
- trend
- weighted_average

5.42 skdiscovery.table.filters.antenna_offset Namespace Reference

Classes

- class AntennaOffset

5.43 skdiscovery.table.filters.calibrate_grace Namespace Reference

Classes

- class CalibrateGRACE

5.44 skdiscovery.table.filters.combine_columns Namespace Reference

Classes

- class CombineColumns

5.45 skdiscovery.table.filters.dataremover Namespace Reference

Classes

- class DataRemover

5.46 skdiscovery.table.filters.geolocation Namespace Reference

Classes

- class GeoLocationFilter

5.47 skdiscovery.table.filters.hyperbolictan Namespace Reference

Classes

- class HTanFilter

5.48 skdiscovery.table.filters.interpolate Namespace Reference

Classes

- class InterpolateFilter

5.49 skdiscovery.table.filters.kalman Namespace Reference

Classes

- class KalmanFilter

5.50 skdiscovery.table.filters.lowpass Namespace Reference

Classes

- class LowPassFilter

5.51 skdiscovery.table.filters.median Namespace Reference

Classes

- class MedianFilter

5.52 skdiscovery.table.filters.offset_detrend Namespace Reference

Classes

- class OffsetDetrend

5.53 skdiscovery.table.filters.propagate_nans Namespace Reference

Classes

- class PropagateNaNs

5.54 skdiscovery.table.filters.snow_remover Namespace Reference

Classes

- class SnowRemover

5.55 skdiscovery.table.filters.stabilization Namespace Reference

Classes

- class StabilizationFilter

5.56 skdiscovery.table.filters.table_filter Namespace Reference

Classes

- class TableFilter

5.57 skdiscovery.table.filters.trend Namespace Reference

Classes

- class TrendFilter

5.58 skdiscovery.table.filters.weighted_average Namespace Reference

Classes

- class WeightedAverage

5.59 skdiscovery.table.fusion Namespace Reference

Namespaces

- grace
- snow

5.60 skdiscovery.table.fusion.grace Namespace Reference

Classes

- class GraceFusion

5.61 skdiscovery.table.fusion.snow Namespace Reference

Classes

- class SnowFusion

5.62 skdiscovery.table.generators Namespace Reference

Namespaces

- catalog_generator
- data_generator

5.63 skdiscovery.table.generators.catalog_generator Namespace Reference

Classes

- class CatalogGenerator

5.64 skdiscovery.table.generators.data_generator Namespace Reference

Classes

- class DataGenerator

5.65 skdiscovery.utilities Namespace Reference

Namespaces

- amazon_control
- amazon_gui
- astro_tools
- config
- kalman_smoother
- pbo_tools
- random_walks
- spherical_voronoi
- ssh_reverse
- trendTools
- variantdbscan

5.66 skdiscovery.utilities.amazon_control Namespace Reference

Functions

- def init (in_aws_access_key, in_aws_secret, in_aws_region, in_aws_security_group, in_aws_key_name, in_↩ pem_file)
- def closeDispyScheduler ()
- def startDispyScheduler ()
- def generateInfo (instance)
- def updateStatus ()
- def setNumInstances (new_total_instances, instance_type, image_id)
- def createTunnels ()
- def startDispyNode ()
- def resetInstances ()
- def reset ()
- def close ()
- def clearAmazonList ()

Variables

- aws_access_key = None
- aws_secret = None
- aws_region = None
- aws_security_group = None
- aws_key_name = None
- pem_file = None
- ec2_res = None
- ec2_client = None
- list amazon_list = [ ]
- scheduler = None
- popen = None

5.66.1 Function Documentation

5.66.1.1 clearAmazonList()

```
def skdiscovery.utilities.amazon_control.clearAmazonList ( )
```

Shutdown connection tunnels to Amazon instances and clear amazon list.

5.66.1.2 close()

```
def skdiscovery.utilities.amazon_control.close ( )
```

Shutdown all instances, close dispy scheduler and clear Amazon list.

5.66.1.3 closeDispyScheduler()

```
def skdiscovery.utilities.amazon_control.closeDispyScheduler ( )
```

Close the Dispy Scheduler.

5.66.1.4 createTunnels()

```
def skdiscovery.utilities.amazon_control.createTunnels ( )
```

Create reverse ssh tunnels to all instances.

5.66.1.5 generateInfo()

```
def skdiscovery.utilities.amazon_control.generateInfo (
              instance )
```

Read metadata from an Amazon instance.

Returns

metadata for Amazon instance

5.66.1.6 init()

```
def skdiscovery.utilities.amazon_control.init (
              in_aws_access_key,
              in_aws_secret,
              in_aws_region,
              in_aws_security_group,
              in_aws_key_name,
              in_pem_file )
```

The underlying functionality for the Amazon GUI, the user should not need to directly interface with this function.

Parameters

in_aws_access_key	AWS access key
in_aws_secret	AWS Secret Access Key
in_aws_region	AWS region (e.g. us-west-2)
in_aws_security_group	Security Group Name
in_aws_key_name	Name of Key Pair
in_pem_file	Filename of ssh key

5.66.1.7 reset()

```
def skdiscovery.utilities.amazon_control.reset ( )
```

Close and clear Amazon List.

5.66.1.8 resetInstances()

```
def skdiscovery.utilities.amazon_control.resetInstances ( )
```

Reboot Amazon instances.

5.66.1.9 setNumInstances()

```
def skdiscovery.utilities.amazon_control.setNumInstances (
              new_total_instances,
              instance_type,
              image_id )
```

Change the number of running instances.

Parameters

new_total_instances	New number of instances
instance_type	Instance type for new instances
image_id	ID of image (ami-xxxxxxxx)

5.66.1.10 startDispyNode()

```
def skdiscovery.utilities.amazon_control.startDispyNode ( )
```

Start dispy on each Amazon instance.

5.66.1.11 startDispyScheduler()

```
def skdiscovery.utilities.amazon_control.startDispyScheduler ( )
```

Start the Dispy Scheduler.

5.66.1.12 updateStatus()

```
def skdiscovery.utilities.amazon_control.updateStatus ( )
```

Update status information in amazon_list.

5.66.2 Variable Documentation

5.66.2.1 amazon_list

```
list skdiscovery.utilities.amazon_control.amazon_list = []
```

5.66.2.2 aws_access_key

```
skdiscovery.utilities.amazon_control.aws_access_key = None
```

5.66.2.3 aws_key_name

```
skdiscovery.utilities.amazon_control.aws_key_name = None
```

5.66.2.4 aws_region

```
skdiscovery.utilities.amazon_control.aws_region = None
```

5.66.2.5 aws_secret

```
skdiscovery.utilities.amazon_control.aws_secret = None
```

5.66.2.6 aws_security_group

```
skdiscovery.utilities.amazon_control.aws_security_group = None
```

5.66.2.7 ec2_client

```
skdiscovery.utilities.amazon_control.ec2_client = None
```

5.66.2.8 ec2_res

```
skdiscovery.utilities.amazon_control.ec2_res = None
```

5.66.2.9 pem_file

```
skdiscovery.utilities.amazon_control.pem_file = None
```

5.66.2.10 popen

```
skdiscovery.utilities.amazon_control.popen = None
```

5.66.2.11 scheduler

```
skdiscovery.utilities.amazon_control.scheduler = None
```

5.67 skdiscovery.utilities.amazon_gui Namespace Reference

Functions

- def init ()
- def drawGUI ()
- def changeButtonState (enabled=True)
- def checkValidValues ()

Variables

- widget_dict = OrderedDict()
- list disable_list
- list key_value_list

5.67.1 Function Documentation

5.67.1.1 changeButtonState()

```
def skdiscovery.utilities.amazon_gui.changeButtonState (
              enabled = True )
```

Enable or disable the buttons and slider in the GUI.

Parameters

enabled	State to change the buttons to.

5.67.1.2 checkValidValues()

```
def skdiscovery.utilities.amazon_gui.checkValidValues ( )
```

Check if Amazon information is valid.

Returns

True if all AWS text fields have data in them, false otherwise

5.67.1.3 drawGUI()

```
def skdiscovery.utilities.amazon_gui.drawGUI ( )
```

Draw the GUI on the screen.

5.67.1.4 init()

```
def skdiscovery.utilities.amazon_gui.init ( )
```

Initialize GUI for controlling Amazon instances.

5.67.2 Variable Documentation

5.67.2.1 disable_list

```
list skdiscovery.utilities.amazon_gui.disable_list
```

Initial value:

```
1 =  ['execute_instances_button', 'initialize_button', 'cache_button', 'restore_button',
2                'new_num_instances_widget']
```

5.67.2.2 key_value_list

```
list skdiscovery.utilities.amazon_gui.key_value_list
```

Initial value:

```
1 =  ['aws_id_widget', 'aws_secret_widget', 'aws_region_widget','aws_security_widget',
2                  'aws_keyname_widget','aws_pem_widget','aws_image_id', 'instance_type_widget']
```

5.67.2.3 widget_dict

```
skdiscovery.utilities.amazon_gui.widget_dict = OrderedDict()
```

5.68 skdiscovery.utilities.astro_tools Namespace Reference

Functions

- def z_to_v (z)
- def v_to_z (v)
- def angular_separation (ra1, dec1, ra2, dec2)
- def move_point (ra, dec, ang_dist, bearing)
- def abs_mag (app_mag, z)
- def app_mag (abs_mag, z)
- def nfw (R, norm_constant, Rs, Rcore)
- def lf (x, A, mstar, alpha)
- def dlf (x, A, m1, a1, m2, a2)
- def cdf_dlf (x, A, m1, a1, m2, a2, start=-26)
- def inv_cdf_dlf (p, A, m1, a1, m2, a2, start=-26, end=-15)

5.68.1 Function Documentation

5.68.1.1 abs_mag()

```
def skdiscovery.utilities.astro_tools.abs_mag (
              app_mag,
              z )
```

5.68.1.2 angular_separation()

```
def skdiscovery.utilities.astro_tools.angular_separation (
              ra1,
              dec1,
              ra2,
              dec2 )
```

5.68.1.3 app_mag()

```
def skdiscovery.utilities.astro_tools.app_mag (
              abs_mag,
              z )
```

5.68.1.4 cdf_dlf()

```
def skdiscovery.utilities.astro_tools.cdf_dlf (
              x,
              A,
              m1,
              a1,
              m2,
              a2,
              start = -26 )
```

Cumulative Schechter function.

Second LF is set to be 2∗A of first LF

Parameters

x	magnitude
A	Scale factor
m1	Knee of distribution 1
a1	Faint-end turnover of first lf
m2	Knee of distribution 2
a2	Faint-end turnover of second lf
start	Brightest magnitude

Returns

Probability that galaxy has a magnitude greater than x

5.68.1.5 dlf()

```
def skdiscovery.utilities.astro_tools.dlf (
              x,
              A,
              m1,
              a1,
              m2,
              a2 )
```

double Schechter function.

Second LF is set to be 2∗A of first LF

Parameters

x	magnitude
A	Scale factor
m1	Knee of distribution 1
a1	Faint-end turnover of first lf
m2	Knee of distribution 2
a2	Faint-end turnover of second lf

Returns

float: Double Schecter function at magnitude x

5.68.1.6 inv_cdf_dlf()

```
def skdiscovery.utilities.astro_tools.inv_cdf_dlf (
              p,
```

```
                A,
                m1,
                a1,
                m2,
                a2,
                start = -26,
                end = -15 )
```

Inverse Cumulative Schechter function.

Second LF is set to be 2∗A of first LF

Parameters

p	probability
A	Scale factor
m1	Knee of distribution 1
a1	Faint-end turnover of first lf
m2	Knee of distribution 2
a2	Faint-end turnover of second lf
start	Brightest magnitude
end	Faintest possible magnitude

Returns

Magnitude associated with cdf probability p

5.68.1.7 lf()

```
def skdiscovery.utilities.astro_tools.lf (
                x,
                A,
                mstar,
                alpha )
```

Schechter function.

Parameters

x	magnitude
A	Scale factor
mstar	Knee of distribution
alpha	Faint-end turnover

Returns

float: Schecter function at magnitude x

5.68.1.8 move_point()

```
def skdiscovery.utilities.astro_tools.move_point (
                ra,
                dec,
                ang_dist,
                bearing )
```

Move a point along a great circle at a particular bearing.

All inputs are in degrees The formula was obtained from http://www.movable-type.co.uk/scripts/latlong.↩ html

Parameters

ra	Starting right ascension
dec	Starting declination
ang_dist	Angular distance to travel
bearing	Direction to travel (0 is north, 90 is positive RA)

Returns

tuple containing updated ra and dec

5.68.1.9 nfw()

```
def skdiscovery.utilities.astro_tools.nfw (
                R,
                norm_constant,
                Rs,
                Rcore )
```

2D Navarro-Frenk-White surface radial profile probability density

See

Navarro, J. F., Frenk, C. S., & White, S. D. M. 1996, ApJ, 462, 563 Bartelmann, M., A&A, 1996, 313, 697 Rykoff, E.S., et al., ApJ, 746, 178

Parameters

R	Radius
norm_constant	Normalization constant
Rs	Scale radius
Rcore	Since NFW profile diverges at R=0, the value at the center is held fixed starting at Rcore

Returns

probability density of profile at R

5.68.1.10 v_to_z()

```
def skdiscovery.utilities.astro_tools.v_to_z (
              v )
```

Convert km/s to redshift assuming all are using special relativity.

Parameters

v	velocity in km/s

Returns

Redshift of object with speed in km/s

5.68.1.11 z_to_v()

```
def skdiscovery.utilities.astro_tools.z_to_v (
              z )
```

Convert redshift to km/s assuming shift is due to velocity using special relativity.

Parameters

z	Redshift

Returns

speed in km/s assuming shift is due to motion using special relativity

5.69 skdiscovery.utilities.config Namespace Reference

Functions

- def getConfig ()
- def writeConfigValue (section, key, value)
- def getDispyPassword ()
- def getHostName ()

5.69.1 Function Documentation

5.69.1.1 getConfig()

```
def skdiscovery.utilities.config.getConfig ( )
```

Retrieve skdiscovery configuaration.

Returns

skdiscovery configparser

5.69.1.2 getDispyPassword()

```
def skdiscovery.utilities.config.getDispyPassword ( )
```

Get dispy password.

Returns

dispy password

5.69.1.3 getHostName()

```
def skdiscovery.utilities.config.getHostName ( )
```

Get Host name for displaying link to dispy status.

Returns

Hostname

5.69.1.4 writeConfigValue()

```
def skdiscovery.utilities.config.writeConfigValue (
              section,
              key,
              value )
```

Write config to disk.

Parameters

section	Name of section
key	Name of key
value	Value to write

5.70 skdiscovery.utilities.kalman_smoother Namespace Reference

Functions

- def KalmanFilter (in_data, t, sigma_sq, R, Pinit, x0=0, invert=False, clipping=5)
- def FitFOGMParameters (data, Pinit=100, R=1, method='brute', x0=0, clipping=5)
- def IterativeGridSearch (f, args, intervals, max_iter=50, tol=0.1, bounds=None, prev_minimum=None, verbose=False)
- def KalmanSmoother (in_data, Pinit=1e6, Restimate=1, clipping=5, method='simple', t=None, sigma_sq=None, R=1, verbose=False, max_clip_iter=10)
- def FOGM (size, t, sigma_sq, R)

5.70.1 Function Documentation

5.70.1.1 FitFOGMParameters()

```
def skdiscovery.utilities.kalman_smoother.FitFOGMParameters (
              data,
              Pinit = 100,
              R = 1,
              method = 'brute',
              x0 = 0,
              clipping = 5 )
```

Find best FOGM parameters for a given data set.

Parameters

data	input data
Pinit	Initial updated covariance
R	Noise Variance
method	Method used to fit FOGM parameters. Use "simple", "brute", or "igrid".
x0	Initial value of x0 to use in the kalman filter
clipping	Clipping factor used when computing cost functions

Returns

best fit correlation time
FOGM variance
Noise variance
correlation time from L
FOGM variance from Chat

5.70.1.2 FOGM()

```
def skdiscovery.utilities.kalman_smoother.FOGM (
              size,
```

```
                t,
                sigma_sq,
                R )
```

Generates data from a First Order Gaussian-Markov process.

Parameters

size	Number of data points
t	Correlation time
sigma_sq	FOGM variance
R	Measurement variance

Returns

Data generated from a FOGM

5.70.1.3 IterativeGridSearch()

```
def skdiscovery.utilities.kalman_smoother.IterativeGridSearch (
                f,
                args,
                intervals,
                max_iter = 50,
                tol = 0.1,
                bounds = None,
                prev_minimum = None,
                verbose = False )
```

Find the minimum of f using an iterative grid search with 3 points per dimension.

Parameters

f	Function to be minimized. The function must accept a tuple with coordinates for the first input.
args	additional arguments to pass on to the function.
intervals	Space that contains the minimum. Must be a list of tuples, even if only 1 dimension.
max_iter	Maximum number of iterations before stopping search.
tol	Error tolerance on result.
bounds	Additonal set of bounds for ending search.
prev_minimum	Previous minimum of function. If the current minimum is close to the previous minimum the serach will stop
verbose	Output debugging information.

Returns

A tuple containing a numpy array with the location of the minimum; and the minimum value of the function.

5.70.1.4 KalmanFilter()

```
def skdiscovery.utilities.kalman_smoother.KalmanFilter (
              in_data,
              t,
              sigma_sq,
              R,
              Pinit,
              x0 = 0,
              invert = False,
              clipping = 5 )
```

Runs the kalman filter on data.

Parameters

in_data	Input data
t	Correlation time
sigma_sq	FOGM variance
R	Noise variance
Pinit	Initial variance
x0	Intial updated state (default: 0)
invert	Run the filter backwards (boolean flag)
clipping	Clipping factor to use when computing cost functions

Returns

the predicted state
the predicted covariance
the updated state
the updated covariance
C_hat, the sample innovation variance
L, a different log variance cost function

5.70.1.5 KalmanSmoother()

```
def skdiscovery.utilities.kalman_smoother.KalmanSmoother (
              in_data,
              Pinit = 1e6,
              Restimate = 1,
              clipping = 5,
              method = 'simple',
              t = None,
              sigma_sq = None,
              R = 1,
              verbose = False,
              max_clip_iter = 10 )
```

Smoother based on a forward and a backward kalman filter.

Parameters

in_data	Data to be smoothed (must be in a Pandas DataFrame)
Pinit	Initial updated covariance
Restimate	Initial estimate for noise variance
clipping	Iteratively remove points beyond clipping $*$ MSE.
method	Method used to fit FOGM parameters. Use either "simple", "brute", or "igrid".
t	Fixed correlation time to use. Both sigma_sq and R must also be specified.
sigma_sq	Fixed sigma squared to use. Both t and R must also be specified.
R	Fixed measurement error to use Both t and sigma_sq must also be specified.
verbose	Output additional information.
max_clip_iter	Maximum number of clip iterations.

Returns

values smoothed by the kalman smoother
associated variance of smoothed result
t, same as input, might have been altered by fitting parameters
sigma_sq, same as input, might have been altered by fitting parameters
R, same as input, might have been altered by fitting parameters

5.71 skdiscovery.utilities.pbo_tools Namespace Reference

Functions

- def mogi (xdata, lat, lon, source_depth, amplitude)
- def finite_sphere (xdata, lat, lon, source_depth, amplitude, alpha_rad)
- def closed_pipe (xdata, lat, lon, source_depth, amplitude, pipe_delta)
- def constant_open_pipe (xdata, lat, lon, source_depth, amplitude, pipe_delta)
- def rising_open_pipe (xdata, lat, lon, source_depth, amplitude, pipe_delta, open_pipe_top)
- def sill (xdata, lat, lon, source_depth, amplitude)
- def dirEigenvectors (coord_list, pca_comps, pdir='H')
- def datetimeToNumber (in_time)

5.71.1 Function Documentation

5.71.1.1 closed_pipe()

```
def skdiscovery.utilities.pbo_tools.closed_pipe (
              xdata,
              lat,
              lon,
              source_depth,
              amplitude,
              pipe_delta )
```

5.71.1.2 constant_open_pipe()

```
def skdiscovery.utilities.pbo_tools.constant_open_pipe (
              xdata,
              lat,
              lon,
              source_depth,
              amplitude,
              pipe_delta )
```

5.71.1.3 datetimeToNumber()

```
def skdiscovery.utilities.pbo_tools.datetimeToNumber (
              in_time )
```

Converts input pandas Timestamp or pandas DatetimeIndex to unix time.

Parameters

in_time	Input pandas timestamp or pandas DatetimeIndex

Returns

unix time

5.71.1.4 dirEigenvectors()

```
def skdiscovery.utilities.pbo_tools.dirEigenvectors (
              coord_list,
              pca_comps,
              pdir = 'H' )
```

5.71.1.5 finite_sphere()

```
def skdiscovery.utilities.pbo_tools.finite_sphere (
              xdata,
              lat,
              lon,
              source_depth,
              amplitude,
              alpha_rad )
```

5.71.1.6 mogi()

```
def skdiscovery.utilities.pbo_tools.mogi (
              xdata,
              lat,
              lon,
              source_depth,
              amplitude )
```

Compute the surface deformation due to changes in a mogi source.

Parameters

xdata	List of the position data with each array element containing [direction (x, y, or z), lat, lon]
lat	Latitude of source
lon	Longitude of source
source_depth	Depth of source
amplitude	Amplitude of mogi source

Returns

list of resulting deformation for each point in xdata

5.71.1.7 rising_open_pipe()

```
def skdiscovery.utilities.pbo_tools.rising_open_pipe (
              xdata,
              lat,
              lon,
              source_depth,
              amplitude,
              pipe_delta,
              open_pipe_top )
```

5.71.1.8 sill()

```
def skdiscovery.utilities.pbo_tools.sill (
              xdata,
              lat,
              lon,
              source_depth,
              amplitude )
```

5.72 skdiscovery.utilities.random_walks Namespace Reference

Functions

- def uniform_walk (pos, grid, step_size=None)
- def gaussian_walk (pos, grid, step_size=None)
- def keep_in_bound (pos, grid)

5.72.1 Function Documentation

5.72.1.1 gaussian_walk()

```
def skdiscovery.utilities.random_walks.gaussian_walk (
              pos,
              grid,
              step_size = None )
```

A gaussian random walk function.

Parameters

pos	tuple of input point
grid	bounds for walk
step_size	maximal step size

Returns

position tuple

5.72.1.2 keep_in_bound()

```
def skdiscovery.utilities.random_walks.keep_in_bound (
              pos,
              grid )
```

Function for truncating and bounding the random walk to within the defined grid.

Parameters

pos	tuple of the point to be checked
grid	the bounds for limiting the walk

Returns

position tuple after bounding the point

5.72.1.3 uniform_walk()

```
def skdiscovery.utilities.random_walks.uniform_walk (
              pos,
              grid,
              step_size = None )
```

A uniform random walk function.

Parameters

pos	tuple of input point
grid	bounds for walk
step_size	maximal step size

Returns

position tuple

5.73 skdiscovery.utilities.spherical_voronoi Namespace Reference

Functions

- def sphericalToXYZ (lat, lon, radius=1)
- def xyzToSpherical (x, y, z)
- def find_match (region_index, region_list)
- def getVoronoiCollection (data, lat_name, lon_name, bmap=None, v_name=None, full_sphere=False, max_v=.3, min_v=-0.3, cmap=matplotlib.cm.get_cmap('jet'))

5.73.1 Function Documentation

5.73.1.1 find_match()

```
def skdiscovery.utilities.spherical_voronoi.find_match (
              region_index,
              region_list )
```

Find neighboring regions.

Parameters

region_index	Numeric index of region to find matches for (number between 0 and len(vertices))
region_list	list of lists of vertices that define regions

Returns

Numeric indices of regions that border the region specified by region_index

5.73.1.2 getVoronoiCollection()

```
def skdiscovery.utilities.spherical_voronoi.getVoronoiCollection (
              data,
              lat_name,
              lon_name,
              bmap = None,
              v_name = None,
              full_sphere = False,
              max_v = .3,
              min_v = -0.3,
              cmap = matplotlib.cm.get_cmap('jet') )
```

Perform a Spherical Voronoi Tessellation on the input data.

In the case where the data is restricted to one part of the globe, a polygon will not be returned for all objects, as matplotlib polygons won't be able to stretch over half the globe.

Parameters

data	Input pandas data frame
lat_name	Name of latitude column
lon_name	Name of longitude column
bmap	Basemap instance used to convert from lat, lon coordinates to projection coordinates
v_name	Name of value column. Use this to color each cell according to a value.
full_sphere	Set to true if the data spans the entire globe. If false, a fictional point is created during tessellation and removed later to work around issues when polygons are suppose to span the over half the globe.
max_v	Specify a maximum value to use when assigning values to the tessellation
min_v	Specify a minimum value to use when assigning values to the tessellation
cmap	Matplotlib color map to use

Returns

Matplotlib patch collection of tessellation, scipy.spatial.SphericalVoronoi object, integer index of objects in patch collection.

5.73.1.3 sphericalToXYZ()

```
def skdiscovery.utilities.spherical_voronoi.sphericalToXYZ (
              lat,
              lon,
              radius = 1 )
```

Convert spherical coordinates to x,y,z.

Parameters

lat	Latitude, scalar or array
lon	Longitude, scalar or array
radius	Sphere's radius

Returns

Numpy array of x,y,z coordinates

5.73.1.4 xyzToSpherical()

```
def skdiscovery.utilities.spherical_voronoi.xyzToSpherical (
              x,
              y,
              z )
```

Convert x,y,z to spherical coordinates.

Parameters

x	Cartesian coordinate x
y	Cartesian coordinate y
z	Cartesian coordinate z

Returns

numpy array of latitude,longitude, and radius

5.74 skdiscovery.utilities.ssh_reverse Namespace Reference

Classes

- class ReverseTunnel

Functions

- def print_verbose (s, verbose=False)
- def handler (chan, host, port, verbose=False)
- def reverse_forward_tunnel (server_port, remote_host, remote_port, transport, check=30, verbose=False)

5.74.1 Function Documentation

5.74.1.1 handler()

```
def skdiscovery.utilities.ssh_reverse.handler (
              chan,
              host,
              port,
              verbose = False )
```

Handler is responsible for sending and receiving data through ssh tunnel.

Parameters

chan	SSH Channel for transferring data
host	Address of remote host
port	Port to forward
verbose	Print status information

5.74.1.2 print_verbose()

```
def skdiscovery.utilities.ssh_reverse.print_verbose (
              s,
              verbose = False )
```

Print statement if verbose is True.

Parameters

s	Statement to print
verbose	Print only if verbose is True

5.74.1.3 reverse_forward_tunnel()

```
def skdiscovery.utilities.ssh_reverse.reverse_forward_tunnel (
              server_port,
              remote_host,
              remote_port,
```

```
                transport,
                check = 30,
                verbose = False )
```

Creates a reverse ssh tunnel.

Parameters

server_port	Port on local host
remote_host	Address of remote host
remote_port	Port of remote host
transport	SSH Transport
check	Amount of time to wait in seconds when opening up a channel
verbose	Print status information

Returns

Thread running reverse ssh tunnel, event used to close ssh tunnel, list of child threads started by main thread

5.75 skdiscovery.utilities.trendTools Namespace Reference

Functions

- def getTrend (xdata)
- def sinuFits (xdata, fitN=2, rmve=1)
- def interpNaN (data)
- def medianFilter (data, window, interpolate=True)

5.75.1 Function Documentation

5.75.1.1 getTrend()

```
def skdiscovery.utilities.trendTools.getTrend (
                xdata )
```

5.75.1.2 interpNaN()

```
def skdiscovery.utilities.trendTools.interpNaN (
                data )
```

5.75.1.3 medianFilter()

```
def skdiscovery.utilities.trendTools.medianFilter (
                data,
                window,
                interpolate = True )
```

5.75.1.4 sinuFits()

```
def skdiscovery.utilities.trendTools.sinuFits (
              xdata,
              fitN = 2,
              rmve = 1 )
```

5.76 skdiscovery.utilities.variantdbscan Namespace Reference

Classes

- class VariantDBScan

5.77 skdiscovery.visualization Namespace Reference

Namespaces

- multi_ca_plot
- multi_dist

5.78 skdiscovery.visualization.multi_ca_plot Namespace Reference

Functions

- def multiCaPlot (pipeline, mogiFlag=False, offset=.15, direction='H', pca_comp=0, scaleFactor=2.5, map_res='i')

5.78.1 Function Documentation

5.78.1.1 multiCaPlot()

```
def skdiscovery.visualization.multiCaPlot (
              pipeline,
              mogiFlag = False,
              offset = .15,
              direction = 'H',
              pca_comp = 0,
              scaleFactor = 2.5,
              map_res = 'i' )
```

The multiCaPlot function generates a geographic eigenvector plot of several pipeline runs.

This function plots multiple pipeline runs over perturbed pipeline parameters. The various perturbations are plotted more transparently (alpha=.5), while the median eigen_vector and Mogi inversion are plotted in solid blue and red

Parameters

pipeline	The pipeline object with multiple runs
mogiFlag	Flag to indicate plotting the Mogi source as well as the PCA
offset	Offset for padding the corners of the generated map
direction	Indicates the eigenvectors to plot. Only Horizontal component is currently supported ('H')
pca_comp	Choose the PCA component to use (integer)
scaleFactor	Size of the arrow scaling factor

5.79 skdiscovery.visualization.multi_dist Namespace Reference

Functions

- def calc_distance_map (pipeline, ap_name, ca_name, ca_type, plotFlag=True, histIdx=False, fontsize=10)

Variables

- font

5.79.1 Function Documentation

5.79.1.1 calc_distance_map()

```
def skdiscovery.visualization.calc_distance_map (
              pipeline,
              ap_name,
              ca_name,
              ca_type,
              plotFlag = True,
              histIdx = False,
              fontsize = 10 )
```

5.79.2 Variable Documentation

5.79.2.1 font

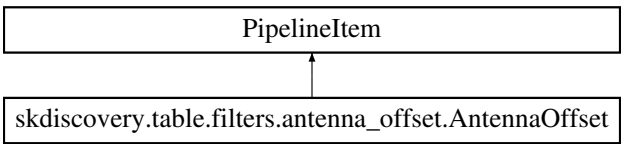
```
skdiscovery.visualization.font
```

Chapter 6

Class Documentation

6.1 skdiscovery.table.filters.antenna_offset.AntennaOffset Class Reference

Inheritance diagram for skdiscovery.table.filters.antenna_offset.AntennaOffset:



Public Member Functions

- def __init__ (self, str_description, antenna_data, min_diff=0.0, column_list=None)
- def process (self, obj_data)

6.1.1 Detailed Description

Applies corrections to fix offsets in PBO GPS data induced by antenna changes.

6.1.2 Constructor & Destructor Documentation

6.1.2.1 __init__()

```
def skdiscovery.table.filters.antenna_offset.AntennaOffset.__init__ (
              self,
              str_description,
              antenna_data,
              min_diff = 0.0,
              column_list = None )
```

Initialize AntennaOffset function.

Parameters

str_description	String describing the filter
antenna_data	Data containing the log of antenna changes
min_diff	Difference in position needed to be considered an offset
column_list	Names of the columns to apply the function to

6.1.3 Member Function Documentation

6.1.3.1 process()

```
def skdiscovery.table.filters.antenna_offset.AntennaOffset.process (
            self,
            obj_data )
```

Applies the function to the data, updating in place.

Parameters

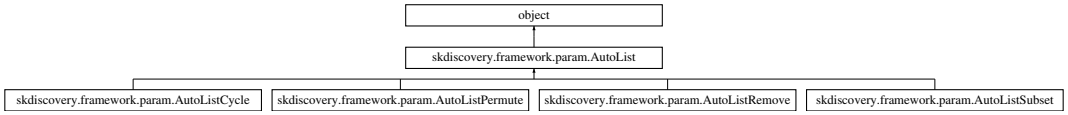
obj_data	Table data wrapper

The documentation for this class was generated from the following file:

- table/filters/antenna_offset.py

6.2 skdiscovery.framework.param.AutoList Class Reference

Inheritance diagram for skdiscovery.framework.param.AutoList:



Public Member Functions

- def __init__ (self, val_list)
- def val (self)
- def perturb (self)
- def reset (self)
- def __str__ (self)
- def __len__ (self)
- def __getitem__ (self, ii)
- def __setitem__ (self, ii, val)
- def __call__ (self)

6.2.1 Detailed Description

specifies a list for returning selections of lists, as opposed to a single element

6.2.2 Constructor & Destructor Documentation

6.2.2.1 __init__()

```
def skdiscovery.framework.param.AutoList.__init__ (
              self,
              val_list )
```

Construct a AutoList object.

Parameters

val_list	List of parameters

6.2.3 Member Function Documentation

6.2.3.1 __call__()

```
def skdiscovery.framework.param.AutoList.__call__ (
              self )
```

Retrieve current list.

Returns

Current list

6.2.3.2 __getitem__()

```
def skdiscovery.framework.param.AutoList.__getitem__ (
              self,
              ii )
```

Retrieves item from list.

Parameters

ii	Index of item to be retrieved

Returns

Item at index ii

6.2.3.3 __len__()

```
def skdiscovery.framework.param.AutoList.__len__ (
              self )
```

Retrieves the length of parameters contained in the list.

Returns

Number of elements in the list

6.2.3.4 __setitem__()

```
def skdiscovery.framework.param.AutoList.__setitem__ (
              self,
              ii,
              val )
```

Set a value in the list.

Parameters

ii	Index of list to be set
val	Input value

6.2.3.5 __str__()

```
def skdiscovery.framework.param.AutoList.__str__ (
              self )
```

String representation of class.

Returns

String containing all parmaters in list

6.2.3.6 perturb()

```
def skdiscovery.framework.param.AutoList.perturb (
              self )
```

This class doesn't change list when being perturbed.

6.2.3.7 reset()

```
def skdiscovery.framework.param.AutoList.reset (
              self )
```

Reset current list to initial list.

6.2.3.8 val()

```
def skdiscovery.framework.param.AutoList.val (
              self )
```

Retrieves current list of parameters.

Returns

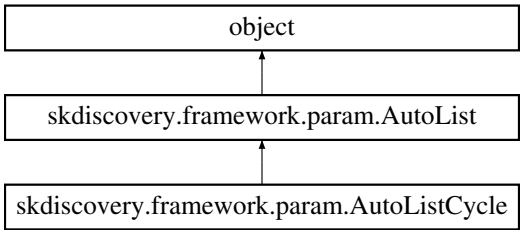
List of current parameters

The documentation for this class was generated from the following file:

- framework/param.py

6.3 skdiscovery.framework.param.AutoListCycle Class Reference

Inheritance diagram for skdiscovery.framework.param.AutoListCycle:



Public Member Functions

- def __init__ (self, list_val_list)
- def perturb (self)
- def reset (self)
- def val (self)
- def __str__ (self)
- def __len__ (self)
- def __getitem__ (self, ii)
- def __setitem__ (self, ii, val)
- def __call__ (self)

6.3.1 Detailed Description

Cycles through a list of list selections.

6.3.2 Constructor & Destructor Documentation

6.3.2.1 __init__()

```
def skdiscovery.framework.param.AutoListCycle.__init__ (
              self,
              list_val_list )
```

Construct a AutoList_Cycle object.

Parameters

list_val_list	List of different lists to cycle through

6.3.3 Member Function Documentation

6.3.3.1 __call__()

```
def skdiscovery.framework.param.AutoList.__call__ (
              self ) [inherited]
```

Retrieve current list.

Returns

Current list

6.3.3.2 __getitem__()

```
def skdiscovery.framework.param.AutoList.__getitem__ (
              self,
              ii ) [inherited]
```

Retrieves item from list.

Parameters

ii	Index of item to be retrieved

Returns

Item at index ii

6.3.3.3 __len__()

```
def skdiscovery.framework.param.AutoList.__len__ (
              self )  [inherited]
```

Retrieves the length of parameters contained in the list.

Returns

Number of elements in the list

6.3.3.4 __setitem__()

```
def skdiscovery.framework.param.AutoList.__setitem__ (
              self,
              ii,
              val )  [inherited]
```

Set a value in the list.

Parameters

ii	Index of list to be set
val	Input value

6.3.3.5 __str__()

```
def skdiscovery.framework.param.AutoList.__str__ (
              self )  [inherited]
```

String representation of class.

Returns

String containing all parmaters in list

6.3.3.6 perturb()

```
def skdiscovery.framework.param.AutoListCycle.perturb (
              self )
```

Select next list from list of lists.

6.3.3.7 reset()

```
def skdiscovery.framework.param.AutoListCycle.reset (
              self )
```

Resets to the first list in the list of lists.

6.3.3.8 val()

```
def skdiscovery.framework.param.AutoList.val (
              self )  [inherited]
```

Retrieves current list of parameters.

Returns

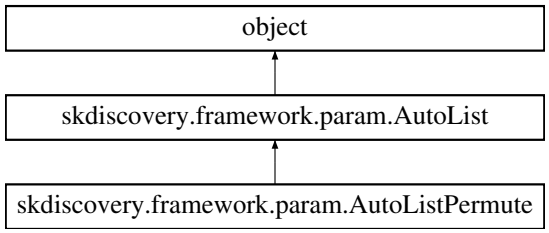
List of current parameters

The documentation for this class was generated from the following file:

- framework/param.py

6.4 skdiscovery.framework.param.AutoListPermute Class Reference

Inheritance diagram for skdiscovery.framework.param.AutoListPermute:



Public Member Functions

- def perturb (self)
- def val (self)
- def reset (self)
- def __str__ (self)
- def __len__ (self)
- def __getitem__ (self, ii)
- def __setitem__ (self, ii, val)
- def __call__ (self)

6.4.1 Detailed Description

A perturber that permutes a list.

6.4.2 Member Function Documentation

6.4.2.1 __call__()

```
def skdiscovery.framework.param.AutoList.__call__ (
              self ) [inherited]
```

Retrieve current list.

Returns

Current list

6.4.2.2 __getitem__()

```
def skdiscovery.framework.param.AutoList.__getitem__ (
              self,
              ii ) [inherited]
```

Retrieves item from list.

Parameters

ii	Index of item to be retrieved

Returns

Item at index ii

6.4.2.3 __len__()

```
def skdiscovery.framework.param.AutoList.__len__ (
              self ) [inherited]
```

Retrieves the length of parameters contained in the list.

Returns

Number of elements in the list

6.4.2.4 __setitem__()

```
def skdiscovery.framework.param.AutoList.__setitem__ (
              self,
              ii,
              val )  [inherited]
```

Set a value in the list.

Parameters

ii	Index of list to be set
val	Input value

6.4.2.5 __str__()

```
def skdiscovery.framework.param.AutoList.__str__ (
              self )  [inherited]
```

String representation of class.

Returns

String containing all parmaters in list

6.4.2.6 perturb()

```
def skdiscovery.framework.param.AutoListPermute.perturb (
              self )
```

Randomly permutes the initial list.

6.4.2.7 reset()

```
def skdiscovery.framework.param.AutoList.reset (
              self )  [inherited]
```

Reset current list to initial list.

6.4.2.8 val()

```
def skdiscovery.framework.param.AutoList.val (
              self )  [inherited]
```

Retrieves current list of parameters.

Returns

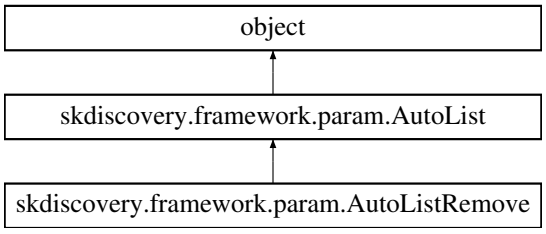
List of current parameters

The documentation for this class was generated from the following file:

- framework/param.py

6.5 skdiscovery.framework.param.AutoListRemove Class Reference

Inheritance diagram for skdiscovery.framework.param.AutoListRemove:



Public Member Functions

- def __init__ (self, val_list)
- def perturb (self)
- def reset (self)
- def val (self)
- def __str__ (self)
- def __len__ (self)
- def __getitem__ (self, ii)
- def __setitem__ (self, ii, val)
- def __call__ (self)

6.5.1 Detailed Description

Removes a different single element from the initial list at each perturb call.

6.5.2 Constructor & Destructor Documentation

6.5.2.1 __init__()

```
def skdiscovery.framework.param.AutoListRemove.__init__ (
              self,
              val_list )
```

Construct a AutoList_Cycle object.

Parameters

val_list	Initial list of parameters.

6.5.3 Member Function Documentation

6.5.3.1 __call__()

```
def skdiscovery.framework.param.AutoList.__call__ (
              self )  [inherited]
```

Retrieve current list.

Returns

Current list

6.5.3.2 __getitem__()

```
def skdiscovery.framework.param.AutoList.__getitem__ (
              self,
              ii )  [inherited]
```

Retrieves item from list.

Parameters

ii	Index of item to be retrieved

Returns

Item at index ii

6.5.3.3 __len__()

```
def skdiscovery.framework.param.AutoList.__len__ (
              self )  [inherited]
```

Retrieves the length of parameters contained in the list.

Returns

Number of elements in the list

6.5.3.4 __setitem__()

```
def skdiscovery.framework.param.AutoList.__setitem__ (
              self,
              ii,
              val )  [inherited]
```

Set a value in the list.

Parameters

ii	Index of list to be set
val	Input value

6.5.3.5 __str__()

```
def skdiscovery.framework.param.AutoList.__str__ (
              self )  [inherited]
```

String representation of class.

Returns

String containing all parmaters in list

6.5.3.6 perturb()

```
def skdiscovery.framework.param.AutoListRemove.perturb (
              self )
```

Systematically change which item is absent from the list.

6.5.3.7 reset()

```
def skdiscovery.framework.param.AutoListRemove.reset (
              self )
```

Reset the list to its initial value.

6.5.3.8 val()

```
def skdiscovery.framework.param.AutoList.val (
              self )  [inherited]
```

Retrieves current list of parameters.

Returns

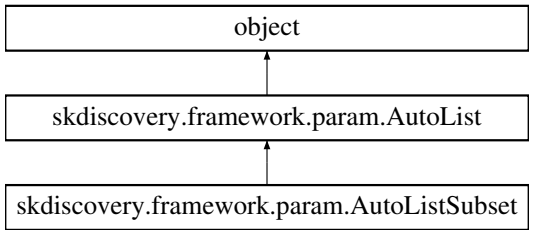
List of current parameters

The documentation for this class was generated from the following file:

- framework/param.py

6.6 skdiscovery.framework.param.AutoListSubset Class Reference

Inheritance diagram for skdiscovery.framework.param.AutoListSubset:



Public Member Functions

- def perturb (self)
- def val (self)
- def reset (self)
- def __str__ (self)
- def __len__ (self)
- def __getitem__ (self, ii)
- def __setitem__ (self, ii, val)
- def __call__ (self)

6.6.1 Detailed Description

A list perturber that creates random subsets of a list.

List can be empty.

6.6.2 Member Function Documentation

6.6.2.1 __call__()

```
def skdiscovery.framework.param.AutoList.__call__ (
              self )  [inherited]
```

Retrieve current list.

Returns

Current list

6.6.2.2 __getitem__()

```
def skdiscovery.framework.param.AutoList.__getitem__ (
              self,
              ii )  [inherited]
```

Retrieves item from list.

Parameters

ii	Index of item to be retrieved

Returns

Item at index ii

6.6.2.3 __len__()

```
def skdiscovery.framework.param.AutoList.__len__ (
              self )  [inherited]
```

Retrieves the length of parameters contained in the list.

Returns

Number of elements in the list

6.6.2.4 __setitem__()

```
def skdiscovery.framework.param.AutoList.__setitem__ (
              self,
              ii,
              val )  [inherited]
```

Set a value in the list.

Parameters

ii	Index of list to be set
val	Input value

6.6.2.5 __str__()

```
def skdiscovery.framework.param.AutoList.__str__ (
              self )  [inherited]
```

String representation of class.

Returns

String containing all parmaters in list

6.6.2.6 perturb()

```
def skdiscovery.framework.param.AutoListSubset.perturb (
              self )
```

Peturb the list by selecting a random subset of the initial list.

6.6.2.7 reset()

```
def skdiscovery.framework.param.AutoList.reset (
              self )  [inherited]
```

Reset current list to initial list.

6.6.2.8 val()

```
def skdiscovery.framework.param.AutoList.val (
              self )  [inherited]
```

Retrieves current list of parameters.

Returns

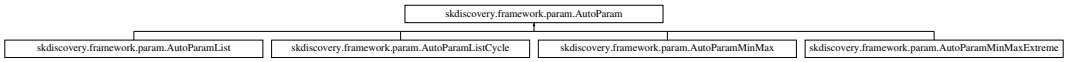
List of current parameters

The documentation for this class was generated from the following file:

- framework/param.py

6.7 skdiscovery.framework.param.AutoParam Class Reference

Inheritance diagram for skdiscovery.framework.param.AutoParam:



Public Member Functions

- def __init__ (self, val_init)
- def perturb (self)
- def reset (self)
- def __str__ (self)
- def __call__ (self)

6.7.1 Detailed Description

Defines a tunable parameter class inherited by specific subclasses.

AutoParam class and subclass work on a single value. functions perturb value and reset to initial value

6.7.2 Constructor & Destructor Documentation

6.7.2.1 __init__()

```
def skdiscovery.framework.param.AutoParam.__init__ (
              self,
              val_init )
```

Initialize an AutoParam object.

Parameters

val_init	Value for parameter

6.7.3 Member Function Documentation

6.7.3.1 __call__()

```
def skdiscovery.framework.param.AutoParam.__call__ (
              self )
```

Retrieves current value of the parameter.

Returns

Current value of the parameter

6.7.3.2 __str__()

```
def skdiscovery.framework.param.AutoParam.__str__ (
              self )
```

String representation of class.

Returns

String of current value

6.7.3.3 perturb()

```
def skdiscovery.framework.param.AutoParam.perturb (
              self )
```

Perturb paramter.

This class doesn't change the value.

6.7.3.4 reset()

```
def skdiscovery.framework.param.AutoParam.reset (
              self )
```

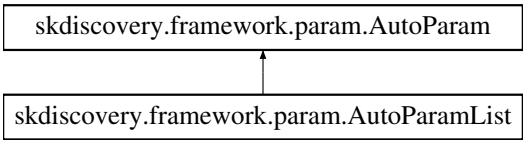
Reset value to initial value.

The documentation for this class was generated from the following file:

- framework/param.py

6.8 skdiscovery.framework.param.AutoParamList Class Reference

Inheritance diagram for skdiscovery.framework.param.AutoParamList:



Public Member Functions

- def __init__ (self, val_init, val_list)
- def perturb (self)
- def reset (self)
- def __str__ (self)
- def __call__ (self)

6.8.1 Detailed Description

a tunable parameter with a specified list of choices that perturb randomly selects from

6.8.2 Constructor & Destructor Documentation

6.8.2.1 __init__()

```
def skdiscovery.framework.param.AutoParamList.__init__ (
              self,
              val_init,
              val_list )
```

Construct an AutoParamList object.

Parameters

val_init	initial value for the parameter
val_list	List of possible variants for the parameter

6.8.3 Member Function Documentation

6.8.3.1 __call__()

```
def skdiscovery.framework.param.AutoParam.__call__ (
              self )  [inherited]
```

Retrieves current value of the parameter.

Returns

Current value of the parameter

6.8.3.2 __str__()

```
def skdiscovery.framework.param.AutoParam.__str__ (
              self )  [inherited]
```

String representation of class.

Returns

String of current value

6.8.3.3 perturb()

```
def skdiscovery.framework.param.AutoParamList.perturb (
              self )
```

Randomly select a value from val_list.

6.8.3.4 reset()

```
def skdiscovery.framework.param.AutoParamList.reset (
              self )
```

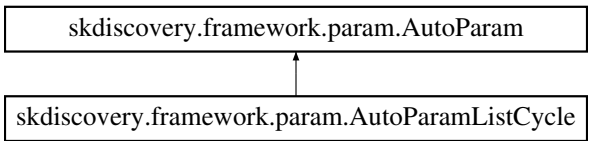
Reset the list to the default value.

The documentation for this class was generated from the following file:

- framework/param.py

6.9 skdiscovery.framework.param.AutoParamListCycle Class Reference

Inheritance diagram for skdiscovery.framework.param.AutoParamListCycle:



Public Member Functions

- def __init__ (self, val_list)
- def perturb (self)
- def reset (self)
- def __str__ (self)
- def __call__ (self)

6.9.1 Detailed Description

Cycles through a list of paramters.

6.9.2 Constructor & Destructor Documentation

6.9.2.1 __init__()

```
def skdiscovery.framework.param.AutoParamListCycle.__init__ (
              self,
              val_list )
```

Construct an AutoParamListCycle.

Parameters

val_list	List of possible variants for the parameter

6.9.3 Member Function Documentation

6.9.3.1 __call__()

```
def skdiscovery.framework.param.AutoParam.__call__ (
              self )  [inherited]
```

Retrieves current value of the parameter.

Returns

Current value of the parameter

6.9.3.2 __str__()

```
def skdiscovery.framework.param.AutoParam.__str__ (
              self )  [inherited]
```

String representation of class.

Returns

String of current value

6.9.3.3 perturb()

```
def skdiscovery.framework.param.AutoParamListCycle.perturb (
              self )
```

Select the next value from the list of parameters.

6.9.3.4 reset()

```
def skdiscovery.framework.param.AutoParamListCycle.reset (
              self )
```

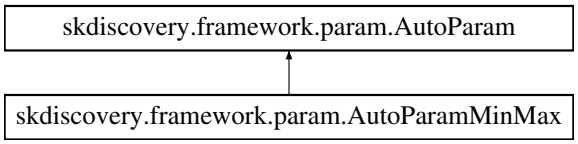
Reset the list to the default values.

The documentation for this class was generated from the following file:

- framework/param.py

6.10 skdiscovery.framework.param.AutoParamMinMax Class Reference

Inheritance diagram for skdiscovery.framework.param.AutoParamMinMax:



Public Member Functions

- def __init__ (self, val_init, val_min, val_max)
- def perturb (self)
- def reset (self)
- def __str__ (self)
- def __call__ (self)

6.10.1 Detailed Description

a tunable parameter with min and max ranges, perturbs to a random value in range

6.10.2 Constructor & Destructor Documentation

6.10.2.1 __init__()

```
def skdiscovery.framework.param.AutoParamMinMax.__init__ (
              self,
              val_init,
              val_min,
              val_max )
```

Construct AutoParamMinMax object.

Parameters

val_init	Initial value for parameter
val_min	Minimum value for parameter
val_max	Maximum value for parameter

6.10.3 Member Function Documentation

6.10.3.1 __call__()

```
def skdiscovery.framework.param.AutoParam.__call__ (
              self )  [inherited]
```

Retrieves current value of the parameter.

Returns

Current value of the parameter

6.10.3.2 __str__()

```
def skdiscovery.framework.param.AutoParam.__str__ (
              self )  [inherited]
```

String representation of class.

Returns

String of current value

6.10.3.3 perturb()

```
def skdiscovery.framework.param.AutoParamMinMax.perturb (
              self )
```

Peturb the paramter by choosing a random value between val_min and val_max.

6.10.3.4 reset()

```
def skdiscovery.framework.param.AutoParam.reset (
              self )  [inherited]
```

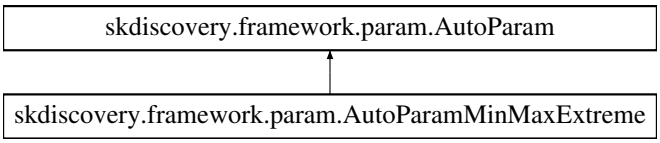
Reset value to initial value.

The documentation for this class was generated from the following file:

- framework/param.py

6.11 skdiscovery.framework.param.AutoParamMinMaxExtreme Class Reference

Inheritance diagram for skdiscovery.framework.param.AutoParamMinMaxExtreme:



Public Member Functions

- def __init__ (self, val_init, val_min, val_max, val_nMax)
- def perturb (self)
- def reset (self)
- def __str__ (self)
- def __call__ (self)

Static Public Attributes

- int n = 1

6.11.1 Detailed Description

a tunable parameter with min and max ranges, picks extreme value min or max every nMax call

6.11.2 Constructor & Destructor Documentation

6.11.2.1 __init__()

```
def skdiscovery.framework.param.AutoParamMinMaxExtreme.__init__ (
              self,
              val_init,
              val_min,
              val_max,
              val_nMax )
```

Construct an AutoParamMinMaxExtreme.

Parameters

val_init	Initial value for parameter
val_min	Minimum value for parameter
val_max	Maximum value for parameter
val_nMax	Choose either the maximum or minimum after val_nMax peturbs

6.11.3 Member Function Documentation

6.11.3.1 __call__()

```
def skdiscovery.framework.param.AutoParam.__call__ (
              self )  [inherited]
```

Retrieves current value of the parameter.

Returns

Current value of the parameter

6.11.3.2 __str__()

```
def skdiscovery.framework.param.AutoParam.__str__ (
              self )  [inherited]
```

String representation of class.

Returns

String of current value

6.11.3.3 perturb()

```
def skdiscovery.framework.param.AutoParamMinMaxExtreme.perturb (
              self )
```

After val_nMax, select the maximum or minimum value, otherwise randomly select a number between val_min and val_max.

6.11.3.4 reset()

```
def skdiscovery.framework.param.AutoParam.reset (
              self )  [inherited]
```

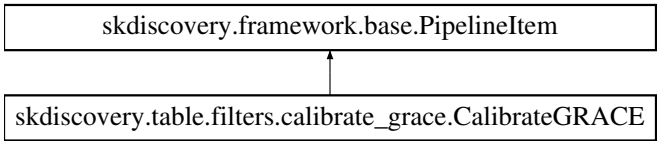
Reset value to initial value.

The documentation for this class was generated from the following file:

- framework/param.py

6.12 skdiscovery.table.filters.calibrate_CalibrateGRACE Class Reference

Inheritance diagram for skdiscovery.table.filters.calibrate_CalibrateGRACE:



Public Member Functions

- def __init__ (self, str_description, ewd_column_name='EWD', round_dates=True)
- def process (self, obj_data)
- def perturbParams (self)
- def resetParams (self)
- def __str__ (self)
- def getMetadata (self)

6.12.1 Constructor & Destructor Documentation

6.12.1.1 __init__()

```
def skdiscovery.table.filters.calibrate_CalibrateGRACE.__init__ (
              self,
              str_description,
              ewd_column_name = 'EWD',
              round_dates = True )
```

Initialize GRACE calibration filter.

Parameters

str_description	String describing filter
ewd_column_name	Name of new column for the calibrated GRACE data
round_dates	Option for rounding to dates to the nearest day

6.12.2 Member Function Documentation

6.12.2.1 __str__()

```
def skdiscovery.framework.PipelineItem.__str__ (
              self )  [inherited]
```

String represntation of object.

Returns

String listing all currenter parameters

6.12.2.2 getMetadata()

```
def skdiscovery.framework.PipelineItem.getMetadata (
              self )  [inherited]
```

Retrieve metadata about filter.

Returns

String containing the item description and current parameters for filter.

6.12.2.3 perturbParams()

```
def skdiscovery.framework.PipelineItem.perturbParams (
              self )  [inherited]
```

choose other random value for all parameters

6.12.2.4 process()

```
def skdiscovery.table.filters.calibrate_CalibrateGRACE.process (
              self,
              obj_data )
```

Calibrates GRACE, updating in place.

Parameters

obj_data	Table data wrapper

6.12.2.5 resetParams()

```
def skdiscovery.framework.PipelineItem.resetParams (
              self )  [inherited]
```

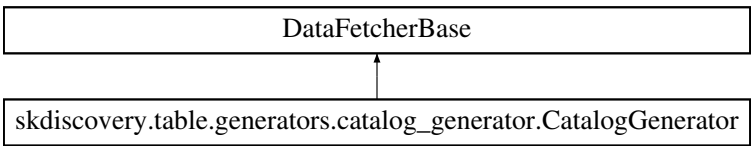
set all parameters to initial value

The documentation for this class was generated from the following file:

- table/filters/calibrate_py

6.13 skdiscovery.table.generators.catalog_generator.CatalogGenerator Class Reference

Inheritance diagram for skdiscovery.table.generators.catalog_generator.CatalogGenerator:



Public Member Functions

- def __init__ (self, ap_paramList, ra1, dec1, ra2, dec2, background_density, z)
- def output (self)
- def nfw_cumulative (self, R)
- def inverse_nfw_cumulative (self, p)

6.13.1 Detailed Description

Generates galaxy catalogs for use in DiscoveryPipeline.

6.13.2 Constructor & Destructor Documentation

6.13.2.1 __init__()

```
def skdiscovery.table.generators.catalog_generator.CatalogGenerator.__init__ (
              self,
              ap_paramList,
              ra1,
              dec1,
              ra2,
              dec2,
              background_density,
              z )
```

Parameters

ap_paramList[seed]	Seed for random number generator
ra1	Left right ascension
dec1	Bottom declination
ra2	Right right ascension
dec2	Top declination
background_density	galaxy background density in galaxies/square degree
z	Redshift of galaxy cluster

6.13.3 Member Function Documentation

6.13.3.1 inverse_nfw_cumulative()

```
def skdiscovery.table.generators.catalog_generator.CatalogGenerator.inverse_nfw_cumulative (
              self,
              p )
```

inverse of radial nfw cumulative distribution

Parameters

p	Probability

Returns

float: Radius corresponding to probability p

6.13.3.2 nfw_cumulative()

```
def skdiscovery.table.generators.catalog_generator.CatalogGenerator.nfw_cumulative (
              self,
              R )
```

Cumulative radial NFW distribution.

Parameters

R	Radius

Returns

float: Probability of being within R

6.13.3.3 output()

```
def skdiscovery.table.generators.catalog_generator.CatalogGenerator.output (
              self )
```

Generates galaxy catalog.

Returns

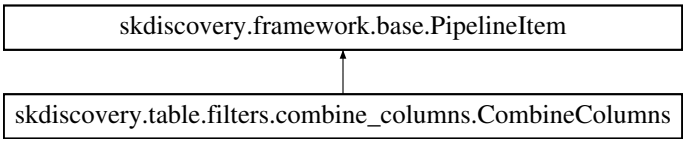
DataWrapper: Table data wrapper of galaxy catalog

The documentation for this class was generated from the following file:

- table/generators/catalog_generator.py

6.14 skdiscovery.table.filters.combine_columns.CombineColumns Class Reference

Inheritance diagram for skdiscovery.table.filters.combine_columns.CombineColumns:



Public Member Functions

- def __init__ (self, str_description, column_1, column_2, new_column_name)
- def process (self, obj_data)
- def perturbParams (self)
- def resetParams (self)
- def __str__ (self)
- def getMetadata (self)

6.14.1 Constructor & Destructor Documentation

6.14.1.1 __init__()

```
def skdiscovery.table.filters.combine_columns.CombineColumns.__init__ (
              self,
              str_description,
              column_1,
              column_2,
              new_column_name )
```

Initialize a CombineColumns object.

Parameters

str_description	String describing filter
column_1	Name of primary column
column_2	Name of secondary column to be used when data from the primary column is not avaiable
new_column_name	Name of resulting column

6.14.2 Member Function Documentation

6.14.2.1 __str__()

```
def skdiscovery.framework.PipelineItem.__str__ (
              self )  [inherited]
```

String represntation of object.

Returns

String listing all currenter parameters

6.14.2.2 getMetadata()

```
def skdiscovery.framework.PipelineItem.getMetadata (
              self )  [inherited]
```

Retrieve metadata about filter.

Returns

String containing the item description and current parameters for filter.

6.14.2.3 perturbParams()

```
def skdiscovery.framework.PipelineItem.perturbParams (
              self )  [inherited]
```

choose other random value for all parameters

6.14.2.4 process()

```
def skdiscovery.table.filters.combine_columns.CombineColumns.process (
              self,
              obj_data )
```

Apply combine column filter to data set, operating on the data_obj.

Parameters

obj_data	Table data wrapper.

6.14.2.5 resetParams()

```
def skdiscovery.framework.PipelineItem.resetParams (
              self )  [inherited]
```

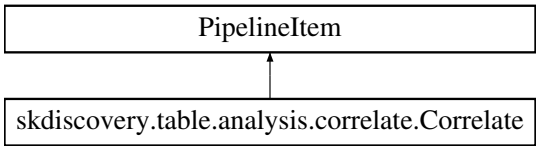
set all parameters to initial value

The documentation for this class was generated from the following file:

- table/filters/combine_columns.py

6.15 skdiscovery.table.analysis.Correlate Class Reference

Inheritance diagram for skdiscovery.table.analysis.Correlate:



Public Member Functions

- def __init__ (self, str_description, column_names=None, local_match=False, correlation_type='pearson')
- def process (self, obj_data)

6.15.1 Detailed Description

Computes the correlation for table data and stores the result as a matrix.

6.15.2 Constructor & Destructor Documentation

6.15.2.1 __init__()

```
def skdiscovery.table.analysis.Correlate.__init__ (
              self,
              str_description,
              column_names = None,
              local_match = False,
              correlation_type = 'pearson' )
```

Initialize Correlate analysis item for use on tables.

Parameters

str_description	String describing analysis item
column_names	List of column names to correlate
local_match	Only correlate data on the same frames
correlation_type	Type of correlation to be passed to pandas ('pearson', 'kendall', 'spearman')

6.15.3 Member Function Documentation

6.15.3.1 process()

```
def skdiscovery.table.analysis.Correlate.process (
              self,
              obj_data )
```

Computes the correlation between columns and stores the results in obj_

Parameters

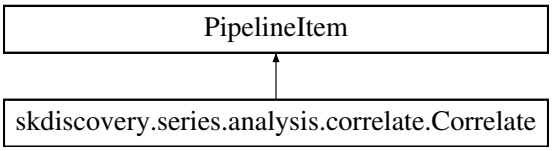
obj_data	Data wrapper

The documentation for this class was generated from the following file:

- table/analysis/correlate.py

6.16 skdiscovery.series.analysis.Correlate Class Reference

Inheritance diagram for skdiscovery.series.analysis.Correlate:



Public Member Functions

- def __init__ (self, str_description, labels=None, column_names=None)
- def process (self, obj_data)

6.16.1 Detailed Description

Computes the correlation for series data.

Stores the result as a matrix

6.16.2 Constructor & Destructor Documentation

6.16.2.1 __init__()

```
def skdiscovery.series.analysis.Correlate.__init__ (
              self,
              str_description,
              labels = None,
              column_names = None )
```

Initialize Correlate analysis item.

Parameters

str_description	String describing analysis item
labels	List of labels used to select data
column_names	List of column names used to select data

6.16.3 Member Function Documentation

6.16.3.1 process()

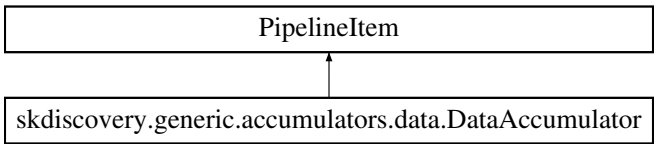
```
def skdiscovery.series.analysis.Correlate.process (
              self,
              obj_data )
```

The documentation for this class was generated from the following file:

- series/analysis/correlate.py

6.17 skdiscovery.generic.accumulators.DataAccumulator Class Reference

Inheritance diagram for skdiscovery.generic.accumulators.DataAccumulator:



Public Member Functions

- def process (self, obj_data)

6.17.1 Detailed Description

Stores a copy of the data in its current state in the pipeline.

6.17.2 Member Function Documentation

6.17.2.1 process()

```
def skdiscovery.generic.accumulators.DataAccumulator.process (
              self,
              obj_data )
```

Store a copy of the data in the object wrapper results.

Parameters

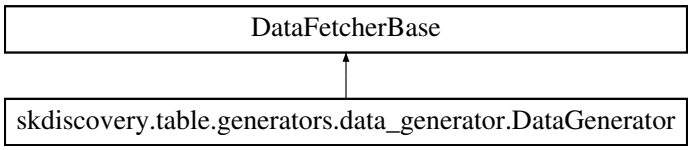
obj_data	Data Wrapper to be copied

The documentation for this class was generated from the following file:

- generic/accumulators/data.py

6.18 skdiscovery.table.generators.data_generator.DataGenerator Class Reference

Inheritance diagram for skdiscovery.table.generators.data_generator.DataGenerator:



Public Member Functions

- def __init__ (self, length, args, seed=None, final_function=None)
- def output (self)

6.18.1 Detailed Description

Class for generating random data.

6.18.2 Constructor & Destructor Documentation

6.18.2.1 __init__()

```
def skdiscovery.table.generators.data_generator.DataGenerator.__init__ (
              self,
              length,
              args,
              seed = None,
              final_function = None )
```

Initialize Random data generator.

Parameters

length	Number of rows to generate

6.18.3 Member Function Documentation

6.18.3.1 output()

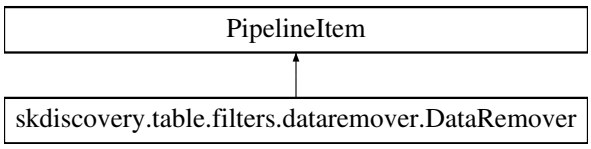
```
def skdiscovery.table.generators.data_generator.DataGenerator.output (
              self )
```

The documentation for this class was generated from the following file:

- table/generators/data_generator.py

6.19 skdiscovery.table.filters.DataRemover Class Reference

Inheritance diagram for skdiscovery.table.filters.DataRemover:



Public Member Functions

- def __init__ (self, str_description, column_names, start=None, end=None, labels=None)
- def process (self, obj_data)

6.19.1 Detailed Description

Sets specified table data to NaN.

6.19.2 Constructor & Destructor Documentation

6.19.2.1 __init__()

```
def skdiscovery.table.filters.DataRemover.__init__ (
              self,
              str_description,
              column_names,
              start = None,
              end = None,
              labels = None )
```

Initialize DataRemover.

Parameters

str_description	String describing filter column_names: List of column names to select data to be removed (using None will apply to all columns)
start	Starting index value
end	Ending index value (inclusive)
labels	List of labels used to select data to be removed (using None will apply to all labels)

6.19.3 Member Function Documentation

6.19.3.1 process()

```
def skdiscovery.table.filters.DataRemover.process (
              self,
              obj_data )
```

NaN's data from DataWrapper.

Parameters

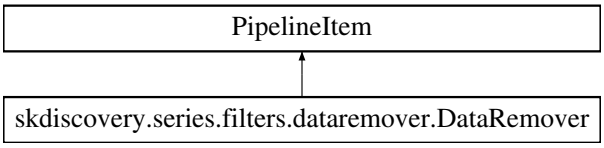
obj_data	Input DataWrapper, will be modified in place

The documentation for this class was generated from the following file:

- table/filters/dataremover.py

6.20 skdiscovery.series.filters.DataRemover Class Reference

Inheritance diagram for skdiscovery.series.filters.DataRemover:



Public Member Functions

- def __init__ (self, str_description, start=None, end=None, labels=None, column_names=None)
- def process (self, obj_data)

6.20.1 Detailed Description

Sets specified series data to NaN.

6.20.2 Constructor & Destructor Documentation

6.20.2.1 __init__()

```
def skdiscovery.series.filters.DataRemover.__init__ (
              self,
              str_description,
              start = None,
              end = None,
              labels = None,
              column_names = None )
```

Initialize DataRemover.

Parameters

str_description	String describing filter
start	Starting index value
end	Ending index value (inclusive)
labels	List of labels used to select data to be removed (None will operate on all labels)
column_names	List of column names to select data to be removed (None will operate on all columns)

6.20.3 Member Function Documentation

6.20.3.1 process()

```
def skdiscovery.series.filters.DataRemover.process (
              self,
              obj_data )
```

NaN's data from DataWrapper.

Parameters

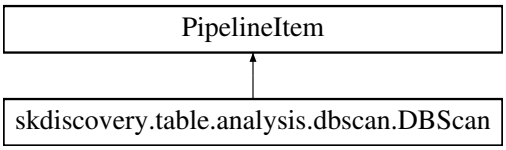
obj_data	Input DataWrapper, which will be modified in place

The documentation for this class was generated from the following file:

- series/filters/dataremover.py

6.21 skdiscovery.table.analysis.dbscan.DBScan Class Reference

Inheritance diagram for skdiscovery.table.analysis.dbscan.DBScan:



Public Member Functions

- def __init__ (self, str_description, ap_paramList, column_names)
- def process (self, obj_data)

6.21.1 Detailed Description

Runs DBScan on table data.

Adds cluster information column to data

6.21.2 Constructor & Destructor Documentation

6.21.2.1 __init__()

```
def skdiscovery.table.analysis.dbscan.DBScan.__init__ (
              self,
              str_description,
              ap_paramList,
              column_names )
```

Initialize DBScan pipelne item.

Parameters

str_description	Description of item
ap_paramList[epsilon]	Distance between two nodes for them to be considered connected
ap_paramList[min_points]	Minimum number of points for a cluster
column_names	List of column names to use

6.21.3 Member Function Documentation

6.21.3.1 process()

```
def skdiscovery.table.analysis.dbscan.DBScan.process (
              self,
              obj_data )
```

Run DBScan on data.

Stores result in data wrapper

```
   @param obj_data: Data wrapper to be processed
```

The documentation for this class was generated from the following file:

- table/analysis/dbscan.py

6.22 skdiscovery.DiscoveryPipeline Class Reference

Public Member Functions

- def __init__ (self, data_fetcher, list_StageContainers)
- def run (self, num_runs=1, perturb_data=False, num_cores=1, amazon=False, verbose=False)
- def perturb (self)
- def reset (self)
- def getMetadata (self)
- def getMetadataHistory (self)
- def perturbData (self)
- def getResults (self, index=None)
- def resultIter (self)
- def plotPipelineInstance (self)
- def plotPipelineStructure (self)
- def getMetadataNestedTypes (self)
- def getMetadataNestedGraph (self)
- def __del__ (self)
- def __str__ (self)

6.22.1 Detailed Description

Pipeline for running the analysis.

6.22.2 Constructor & Destructor Documentation

6.22.2.1 __init__()

```
def skdiscovery.DiscoveryPipeline.__init__ (
              self,
              data_fetcher,
              list_StageContainers )
```

Initialize a new pipeline.

Parameters

data_fetcher	Data fetcher to use as a data source (from skdaccess)
list_StageContainers	List of stage containers

6.22.2.2 __del__()

```
def skdiscovery.DiscoveryPipeline.__del__ (
              self )
```

Shutdown dispy cluster manager.

6.22.3 Member Function Documentation

6.22.3.1 __str__()

```
def skdiscovery.DiscoveryPipeline.__str__ (
              self )
```

String representation of the pipeline.

Returns

String of current metadata of pipeline containers.

6.22.3.2 getMetadata()

```
def skdiscovery.DiscoveryPipeline.getMetadata (
              self )
```

Retrieve Metadata from stage containers.

Returns

list of metadata for the current run

6.22.3.3 getMetadataHistory()

```
def skdiscovery.DiscoveryPipeline.getMetadataHistory (
              self )
```

Get the metadata for each run in the pipeline.

Returns

list of metadata configurations for all runs

6.22.3.4 getMetadataNestedGraph()

```
def skdiscovery.DiscoveryPipeline.getMetadataNestedGraph (
              self )
```

Retrieve the metadata nested graph.

Returns

String: Metadata nested graph

6.22.3.5 getMetadataNestedTypes()

```
def skdiscovery.DiscoveryPipeline.getMetadataNestedTypes (
              self )
```

Get the Metadata Nested Types.

Returns

String: Metadata Nested types

6.22.3.6 getResults()

```
def skdiscovery.DiscoveryPipeline.getResults (
              self,
              index = None )
```

Return results from previous runs.

Parameters

index	Index of run. If None, return all previous results

Returns

results from a run at index. If index=None, returns list of all results

6.22.3.7 perturb()

```
def skdiscovery.DiscoveryPipeline.perturb (
              self )
```

Perturb the paramters in the stage containers.

6.22.3.8 perturbData()

```
def skdiscovery.DiscoveryPipeline.perturbData (
              self )
```

Perturb the input data.

6.22.3.9 plotPipelineInstance()

```
def skdiscovery.DiscoveryPipeline.plotPipelineInstance (
              self )
```

Plot current instance of pipeline stages with metadata.

Returns

iPython display object

6.22.3.10 plotPipelineStructure()

```
def skdiscovery.DiscoveryPipeline.plotPipelineStructure (
              self )
```

Plot pipeline structure.

Returns

iPython display object

6.22.3.11 reset()

```
def skdiscovery.DiscoveryPipeline.reset (
              self )
```

Reset the stage containers to their default values and clear previous runs.

6.22.3.12 resultIter()

```
def skdiscovery.DiscoveryPipeline.resultIter (
              self )
```

Retrieves and iterator to the results and history of the pipeline.

Returns

A 2 component iterator to the results and history of previous runs

6.22.3.13 run()

```
def skdiscovery.DiscoveryPipeline.run (
              self,
              num_runs = 1,
              perturb_data = False,
              num_cores = 1,
              amazon = False,
              verbose = False )
```

Run the pipeline.

Parameters

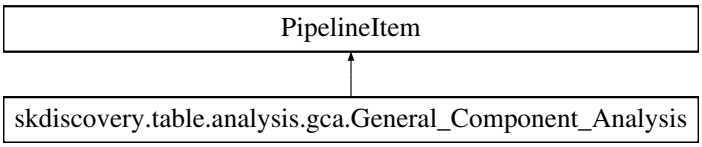
num_runs	Number of times to run the pipeline
peturb_data	Boolean flag. If running the pipeline multiple times then perturb the data instead of the pipeline
num_cores	Number of cores on the local machine to use. Defaults to 1 core. Use 0 to select the minimum between the number of runs and cpu cores.
amazon	Offload the pipeline on amazon
verbose	Display the pipeline for each run

The documentation for this class was generated from the following file:

- framework/discoverypipeline.py

6.23 skdiscovery.table.analysis.General_Component_Analysis Class Reference

Inheritance diagram for skdiscovery.table.analysis.General_Component_Analysis:



Public Member Functions

- def __init__ (self, str_description, ap_paramList, n_components, column_names)
- def process (self, obj_data)

6.23.1 Constructor & Destructor Documentation

6.23.1.1 __init__()

```
def skdiscovery.table.analysis.General_Component_Analysis.__init__ (
              self,
              str_description,
              ap_paramList,
              n_components,
              column_names )
```

Initialize Analysis object.

Parameters

str_description	String description of analysis
ap_paramList[component_type]	Type of CA; either PCA or ICA
ap_paramList[start_time]	Starting time for CA
ap_paramList[end_time]	ending time for CA
n_components	Number of components to compute
column_names	Columns names to use

6.23.2 Member Function Documentation

6.23.2.1 process()

```
def skdiscovery.table.analysis.General_Component_Analysis.process (
              self,
              obj_data )
```

Perform component analysis on data.

Results are added to the data wrapper as a dictionary with results['CA'] = Eigenvenctors results['Projection'] = Projection on to the eigenvectors

Parameters

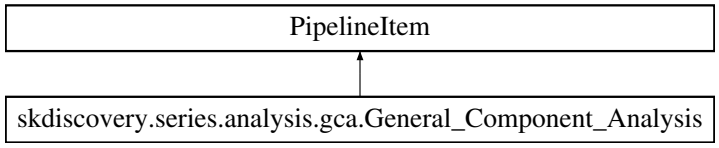
obj_data	Data wrapper

The documentation for this class was generated from the following file:

- table/analysis/gca.py

6.24 skdiscovery.series.analysis.General_Component_Analysis Class Reference

Inheritance diagram for skdiscovery.series.analysis.General_Component_Analysis:



Public Member Functions

- def __init__ (self, str_description, ap_paramList)
- def process (self, obj_data)

6.24.1 Detailed Description

Performs either ICA or PCA analysis on series data.

6.24.2 Constructor & Destructor Documentation

6.24.2.1 __init__()

```
def skdiscovery.series.analysis.General_Component_Analysis.__init__ (
              self,
              str_description,
              ap_paramList )
```

Initialize Analysis object.

Parameters

str_description	String description of analysis
ap_paramList[num_components]	Number of components
ap_paramList[component_type]	Type of component analysis (CA); either PCA or ICA
ap_paramList[start_time]	Starting time for CA
ap_paramList[end_time]	ending time for CA
ap_paramList[labels]	Optional list of label names

6.24.3 Member Function Documentation

6.24.3.1 process()

```
def skdiscovery.series.analysis.General_Component_Analysis.process (
              self,
              obj_data )
```

Perform component analysis on data:

Results are added to the data wrapper as a dictionary with results['CA'] = Eigenvenctors results['Projection'] = Projection on to the eigenvectors

Parameters

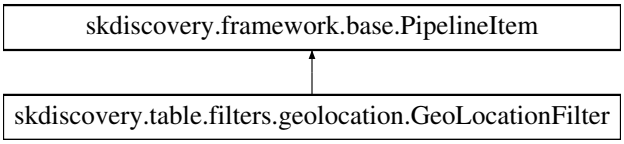
obj_data	Data wrapper containing the data

The documentation for this class was generated from the following file:

- series/analysis/gca.py

6.25 skdiscovery.table.filters.geolocation.GeoLocationFilter Class Reference

Inheritance diagram for skdiscovery.table.filters.geolocation.GeoLocationFilter:



Public Member Functions

- def __init__ (self, str_description, ap_paramList)
- def process (self, obj_data)
- def perturbParams (self)
- def resetParams (self)
- def __str__ (self)
- def getMetadata (self)

6.25.1 Constructor & Destructor Documentation

6.25.1.1 __init__()

```
def skdiscovery.table.filters.geolocation.GeoLocationFilter.__init__ (
              self,
              str_description,
              ap_paramList )
```

Initialize GeolocationFilter.

Parameters

str_description	String describing filter
ap_paramList[ap_lat]	Latitude coordinate
ap_paramList[ap_lon]	Longitude coordinate
ap_paramList[ap_radius]	cut objects whose distance from lat/lon is greater than ap_radius

6.25.2 Member Function Documentation

6.25.2.1 __str__()

```
def skdiscovery.framework.PipelineItem.__str__ (
              self )  [inherited]
```

String represntation of object.

Returns

String listing all currenter parameters

6.25.2.2 getMetadata()

```
def skdiscovery.framework.PipelineItem.getMetadata (
              self )  [inherited]
```

Retrieve metadata about filter.

Returns

String containing the item description and current parameters for filter.

6.25.2.3 perturbParams()

```
def skdiscovery.framework.PipelineItem.perturbParams (
              self )  [inherited]
```

choose other random value for all parameters

6.25.2.4 process()

```
def skdiscovery.table.filters.geolocation.GeoLocationFilter.process (
              self,
              obj_data )
```

Apply geolocation filter to data set.

Parameters

obj_data	Table data wrapper

6.25.2.5 resetParams()

```
def skdiscovery.framework.PipelineItem.resetParams (
              self )  [inherited]
```

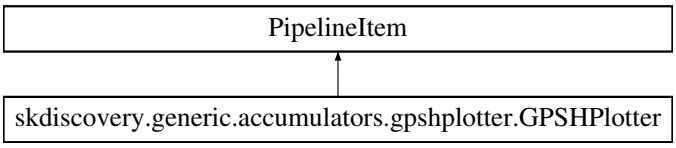
set all parameters to initial value

The documentation for this class was generated from the following file:

- table/filters/geolocation.py

6.26 skdiscovery.generic.accumulators.GPSHPlotter Class Reference

Inheritance diagram for skdiscovery.generic.accumulators.GPSHPlotter:



Public Member Functions

- def __init__ (self, str_description, comp_name, mogi_name=None, pca_dir='H', pca_comp=0, scaleFactor=2.5, offset=.15, KF_tau=0, errorEllipses=False, map_resolution='i')
- def process (self, obj_data)

6.26.1 Detailed Description

Plots results from General_Component_Analysis, for the GPS horizontal or vertical components.

6.26.2 Constructor & Destructor Documentation

6.26.2.1 __init__()

```
def skdiscovery.generic.accumulators.GPSHPlotter.__init__ (
              self,
              str_description,
              comp_name,
              mogi_name = None,
              pca_dir = 'H',
              pca_comp = 0,
              scaleFactor = 2.5,
              offset = .15,
              KF_tau = 0,
              errorEllipses = False,
              map_resolution = 'i' )
```

Initialize GPHSHPlotter.

Parameters

str_description	String describing accumulator
comp_name	Name of the GPCA results for accessing the GPCA output
mogi_name	Name of the Mogi results (optional)
pca_dir	PCA direction to plot, horizontal (H) or vertical (V)
pca_comp	The PCA component that will be plotted
scaleFacter	Scale factor for arrows
offset	Offset for plotting larger area on map
KF_tau	Tau used in kalman filter
errorEllpses	Boolean indicating whether or not to plot errorEllipses

6.26.3 Member Function Documentation

6.26.3.1 process()

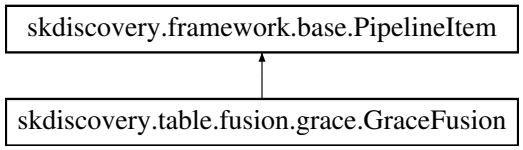
```
def skdiscovery.generic.accumulators.GPSHPlotter.process (
              self,
              obj_data )
```

The documentation for this class was generated from the following file:

- generic/accumulators/gpshplotter.py

6.27 skdiscovery.table.fusion.GraceFusion Class Reference

Inheritance diagram for skdiscovery.table.fusion.GraceFusion:



Public Member Functions

- def __init__ (self, str_description, metadata, column_data_name='Grace', column_error_name='Grace_↩ Uncertainty', gldas="Off")
- def process (self, obj_data)
- def perturbParams (self)
- def resetParams (self)
- def __str__ (self)
- def getMetadata (self)

6.27.1 Detailed Description

Fuses GRACE equivelent water depth time series.

Works on table data (original data from http://grace.jpl.nasa.gov/data/get-data/monthly-mass-grids-land/)

6.27.2 Constructor & Destructor Documentation

6.27.2.1 __init__()

```
def skdiscovery.table.fusion.GraceFusion.__init__ (
              self,
              str_description,
              metadata,
              column_data_name = 'Grace',
              column_error_name = 'Grace_Uncertainty',
              gldas = "Off" )
```

Initialize Grace Fusion item.

Parameters

str_description	String describing item
metadata	Metadata that contains lat,lon coordinates based on data labels
column_data_name	Name of column for GRACE data
column_error_name	Grace Uncertainty column name
gldas	Indicating use of the global land data assimilation water model

6.27.3 Member Function Documentation

6.27.3.1 __str__()

```
def skdiscovery.framework.PipelineItem.__str__ (
              self )  [inherited]
```

String represntation of object.

Returns

String listing all currenter parameters

6.27.3.2 getMetadata()

```
def skdiscovery.framework.PipelineItem.getMetadata (
              self )  [inherited]
```

Retrieve metadata about filter.

Returns

String containing the item description and current parameters for filter.

6.27.3.3 perturbParams()

```
def skdiscovery.framework.PipelineItem.perturbParams (
              self )  [inherited]
```

choose other random value for all parameters

6.27.3.4 process()

```
def skdiscovery.table.fusion.GraceFusion.process (
              self,
              obj_data )
```

Adds columns for GRACE data and uncertainties.

Parameters

obj_data	Input DataWrapper, will be modified in place

6.27.3.5 resetParams()

```
def skdiscovery.framework.PipelineItem.resetParams (
              self )  [inherited]
```

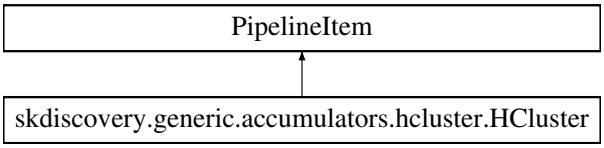
set all parameters to initial value

The documentation for this class was generated from the following file:

- table/fusion/grace.py

6.28 skdiscovery.generic.accumulators.HCluster Class Reference

Inheritance diagram for skdiscovery.generic.accumulators.HCluster:



Public Member Functions

- def __init__ (self, str_description, obj_name)
- def process (self, obj_data)

6.28.1 Detailed Description

Hierarchical Clustering function that produces a cluster map of the distance matrix.

6.28.2 Constructor & Destructor Documentation

6.28.2.1 __init__()

```
def skdiscovery.generic.accumulators.HCluster.__init__ (
              self,
              str_description,
              obj_name )
```

Initialize HCluster.

Parameters

str_description	String describing accumulator
obj_name	Name of distance matrix parameter in the obj_data results

6.28.3 Member Function Documentation

6.28.3.1 process()

```
def skdiscovery.generic.accumulators.HCluster.process (
            self,
            obj_data )
```

Produces a cluster map and stores the linkage results.

Parameters

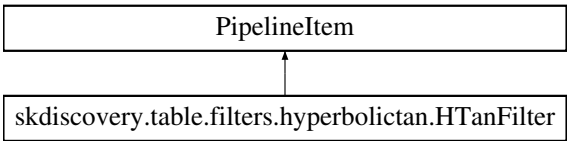
obj_data	Data wrapper

The documentation for this class was generated from the following file:

- generic/accumulators/hcluster.py

6.29 skdiscovery.table.filters.HTanFilter Class Reference

Inheritance diagram for skdiscovery.table.filters.HTanFilter:



Public Member Functions

- def __init__ (self, str_description, t0, amplitude=5, timescale=1., offset=0, slope=0, labels=None, column_↩ names=None, start_time_limit=None, end_time_limit=None, start=None, end=None)
- def process (self, obj_data)

6.29.1 Detailed Description

Filter to subtract an arctan fit from data.

6.29.2 Constructor & Destructor Documentation

6.29.2.1 __init__()

```
def skdiscovery.table.filters.HTanFilter.__init__ (
              self,
              str_description,
              t0,
              amplitude = 5,
              timescale = 1.,
              offset = 0,
              slope = 0,
              labels = None,
              column_names = None,
              start_time_limit = None,
              end_time_limit = None,
              start = None,
              end = None )
```

Fit and remove hyperbolic tangent function from data.

Parameters

str_description	String description of data
t0	Initial time offset of arctangent
amplitude	initial amplitude of arctangent
timescale	Timescale of fit
offset	Initial Y offset of arctangent
slope	Slope of the data
labels	Labels to apply arctangent function to
column_names	Column names to apply arctanget function to
start_time_limit	Starting time bound for fit to arctan (default: no bound)
end_time_limit	Ending time bound for fit to arctan (default: no bound)
start	Index of the first data point to fit (default: index of first data point)
end	Index of the last data point to fit (default: index of last data point)

6.29.3 Member Function Documentation

6.29.3.1 process()

```
def skdiscovery.table.filters.HTanFilter.process (
              self,
              obj_data )
```

Apply Arctangent filter to data param.

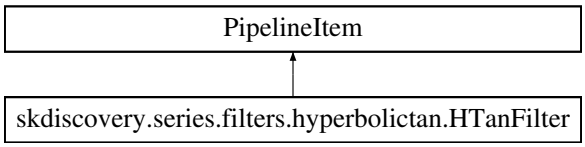
obj_data: Input data. Changes are made in place.

The documentation for this class was generated from the following file:

- table/filters/hyperbolictan.py

6.30 skdiscovery.series.filters.HTanFilter Class Reference

Inheritance diagram for skdiscovery.series.filters.HTanFilter:



Public Member Functions

- def __init__ (self, str_description, t0, amplitude=5, timescale=1., offset=0, slope=0, labels=None, column_names=None, start_time_limit=None, end_time_limit=None, start=None, end=None)
- def process (self, obj_data)

6.30.1 Constructor & Destructor Documentation

6.30.1.1 __init__()

```
def skdiscovery.series.filters.HTanFilter.__init__ (
              self,
              str_description,
              t0,
              amplitude = 5,
              timescale = 1.,
              offset = 0,
              slope = 0,
              labels = None,
              column_names = None,
              start_time_limit = None,
              end_time_limit = None,
              start = None,
              end = None )
```

Fit and remove hyperbolic tangent function from data.

Parameters

str_description	String description of data
t0	Initial time offset of arctangent
amplitude	Initial amplitude of arctangent
timescale	Timescale of fit
offset	Initial Y offset of arctangent
slope	Slope of the data
labels	Labels to apply arctangent function to
column_names	Column names to apply arctanget function to
start_time_limit	Starting time bound for fit to arctan (default: no bound)
end_time_limit	Ending time bound for fit to arctan (default: no bound)
start	Index of the first data point to fit (default: index of first data point)
end	Index of the last data point to fit (default: index of last data point)

6.30.2 Member Function Documentation

6.30.2.1 process()

```
def skdiscovery.series.filters.HTanFilter.process (
              self,
              obj_data )
```

Apply Arctangent filter to data param.

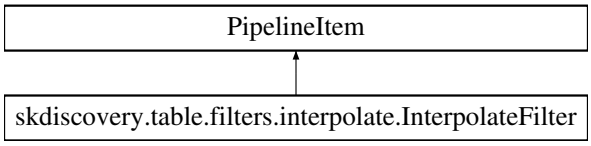
obj_data: Input data. Changes are made in place.

The documentation for this class was generated from the following file:

- series/filters/hyperbolictan.py

6.31 skdiscovery.table.filters.InterpolateFilter Class Reference

Inheritance diagram for skdiscovery.table.filters.InterpolateFilter:



Public Member Functions

- def process (self, obj_data)

6.31.1 Detailed Description

Interpolate missing values on table data.

6.31.2 Member Function Documentation

6.31.2.1 process()

```
def skdiscovery.table.filters.InterpolateFilter.process (
              self,
              obj_data )
```

Interpolate missing data in obj_data DataWrapper.

Parameters

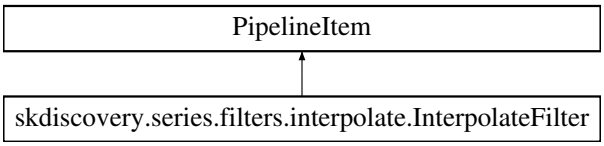
obj_data	Input DataWrapper, will be modified in place

The documentation for this class was generated from the following file:

- table/filters/interpolate.py

6.32 skdiscovery.series.filters.InterpolateFilter Class Reference

Inheritance diagram for skdiscovery.series.filters.InterpolateFilter:



Public Member Functions

- def process (self, obj_data)

6.32.1 Detailed Description

Interpolate missing values on series data.

6.32.2 Member Function Documentation

6.32.2.1 process()

```
def skdiscovery.series.filters.InterpolateFilter.process (
              self,
              obj_data )
```

Interpolate missing data in obj_data DataWrapper.

Parameters

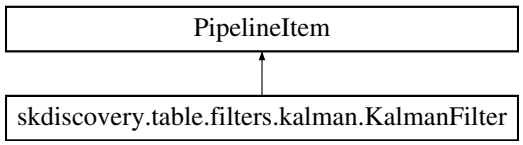
obj_data	Input DataWrapper, will be modified in place

The documentation for this class was generated from the following file:

- series/filters/interpolate.py

6.33 skdiscovery.table.filters.KalmanFilter Class Reference

Inheritance diagram for skdiscovery.table.filters.KalmanFilter:



Public Member Functions

- def __init__ (self, str_description, ap_paramList, uncertainty_clip=5, column_names=None, error_column_names=None, pool_num=0, fillna=True)
- def process (self, obj_data)

6.33.1 Detailed Description

Runs a Kalman Smoother on table data.

For more information see: Ji, K. H. 2011, PhD thesis, MIT.

6.33.2 Constructor & Destructor Documentation

6.33.2.1 __init__()

```
def skdiscovery.table.filters.KalmanFilter.__init__ (
              self,
              str_description,
              ap_paramList,
              uncertainty_clip = 5,
              column_names = None,
              error_column_names = None,
              pool_num = 0,
              fillna = True )
```

Initialize KalmanFilter.

Parameters

str_description	String describing filter
ap_paramList[ap_tau]	the correlation time
ap_paramList[ap_sigmaSq]	the data noise
ap_paramList[ap_R]	the process noise
uncertainty_clip	Clip data with uncertainties greater than uncertainty_clip $*$ median uncertainty
column_names	List of column names to smooth (using None will apply to all columns)
error_column_names	List of error column names to smooth (using None will use default error columns)

6.33.3 Member Function Documentation

6.33.3.1 process()

```
def skdiscovery.table.filters.KalmanFilter.process (
              self,
              obj_data )
```

Apply kalman smoother to data set.

Parameters

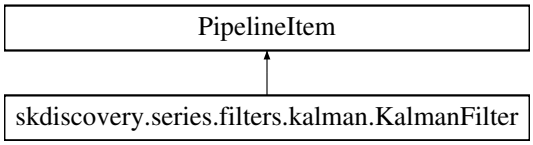
obj_data	Input data. Changes are made in place.

The documentation for this class was generated from the following file:

- table/filters/kalman.py

6.34 skdiscovery.series.filters.KalmanFilter Class Reference

Inheritance diagram for skdiscovery.series.filters.KalmanFilter:



Public Member Functions

- def __init__ (self, str_description, ap_paramList, uncertainty_clip=5)
- def process (self, obj_data)

6.34.1 Detailed Description

Runs a Kalman Smoother on series data.

For more information see: Ji, K. H. 2011, PhD thesis, MIT.

6.34.2 Constructor & Destructor Documentation

6.34.2.1 __init__()

```
def skdiscovery.series.filters.KalmanFilter.__init__ (
              self,
              str_description,
              ap_paramList,
              uncertainty_clip = 5 )
```

Initialize KalmanFilter.

Parameters

str_description	String describing filter
ap_paramList[ap_tau]	the correlation time
ap_paramList[ap_sigmaSq]	the data noise
ap_paramList[ap_R]	the process noise
uncertainty_clip	Clip data with uncertainties greater than uncertainty_clip $*$ median uncertainty

6.34.3 Member Function Documentation

6.34.3.1 process()

```
def skdiscovery.series.filters.KalmanFilter.process (
              self,
              obj_data )
```

Apply kalman smoother to data set.

Parameters

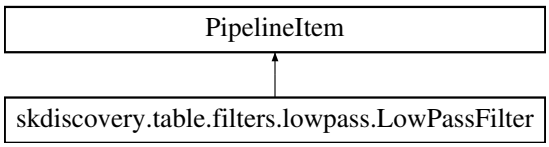
obj_data	Input DataWrapper. Changes are made in place.

The documentation for this class was generated from the following file:

- series/filters/kalman.py

6.35 skdiscovery.table.filters.LowPassFilter Class Reference

Inheritance diagram for skdiscovery.table.filters.LowPassFilter:



Public Member Functions

- def __init__ (self, str_description, ap_paramList)
- def process (self, obj_data)

6.35.1 Detailed Description

A remez low pass filter for table data.

6.35.2 Constructor & Destructor Documentation

6.35.2.1 __init__()

```
def skdiscovery.table.filters.LowPassFilter.__init__ (
              self,
              str_description,
              ap_paramList )
```

Initialize LowPassFilter.

Parameters

str_description	String describing filter
ap_paramList[ntaps]	number of filter taps
ap_paramList[fpassf_per]	frequency passband ratio/percentage
ap_paramList[fstopf_per]	frequency stopband ratio/percentage
ap_paramList[wghts]	band importance weights
ap_paramList[miter]	maximum number of iterations for generating the filter

6.35.3 Member Function Documentation

6.35.3.1 process()

```
def skdiscovery.table.filters.LowPassFilter.process (
              self,
              obj_data )
```

Apply lowpass filter to data set.

Parameters

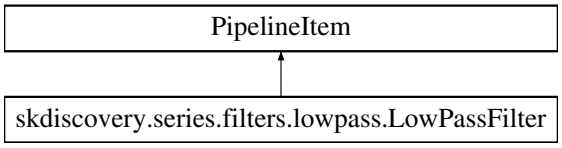
obj_data	Input data. Changes are made in place.

The documentation for this class was generated from the following file:

- table/filters/lowpass.py

6.36 skdiscovery.series.filters.LowPassFilter Class Reference

Inheritance diagram for skdiscovery.series.filters.LowPassFilter:



Public Member Functions

- def __init__ (self, str_description, ap_paramList)
- def process (self, obj_data)

6.36.1 Detailed Description

A FIR Remez (Parks-McLellan) designed low pass filter for series data.

6.36.2 Constructor & Destructor Documentation

6.36.2.1 __init__()

```
def skdiscovery.series.filters.LowPassFilter.__init__ (
              self,
              str_description,
              ap_paramList )
```

Initialize LowPassFilter.

Parameters

str_description	String describing filter
ap_paramList[ntaps]	Number of filter taps
ap_paramList[fpassf_per]	Frequency passband ratio/percentage
ap_paramList[fstopf_per]	Frequency stopband ratio/percentage
ap_paramList[wghts]	Band importance weights
ap_paramList[miter]	Maximum number of iterations for generating the filter

6.36.3 Member Function Documentation

6.36.3.1 process()

```
def skdiscovery.series.filters.LowPassFilter.process (
              self,
              obj_data )
```

Apply lowpass filter to data set, with changes applied in place.

Parameters

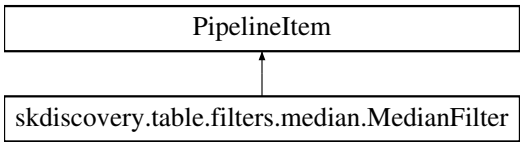
obj_data	Input data with data

The documentation for this class was generated from the following file:

- series/filters/lowpass.py

6.37 skdiscovery.table.filters.MedianFilter Class Reference

Inheritance diagram for skdiscovery.table.filters.MedianFilter:



Public Member Functions

- def __init__ (self, str_description, ap_paramList, interpolate=True, subtract=False, regular_period=True, min_periods=1)
- def process (self, obj_data)

6.37.1 Detailed Description

A Median filter for table data.

6.37.2 Constructor & Destructor Documentation

6.37.2.1 __init__()

```
def skdiscovery.table.filters.MedianFilter.__init__ (
              self,
              str_description,
              ap_paramList,
              interpolate = True,
              subtract = False,
              regular_period = True,
              min_periods = 1 )
```

Initialize MedianFilter.

Parameters

str_description	String describing filter
ap_paramList[ap_window]	median filter window width
interpolate	Interpolate data points before filtering
subtract	Subtract filtered result from original

6.37.3 Member Function Documentation

6.37.3.1 process()

```
def skdiscovery.table.filters.MedianFilter.process (
              self,
              obj_data )
```

Apply median filter to data set.

Parameters

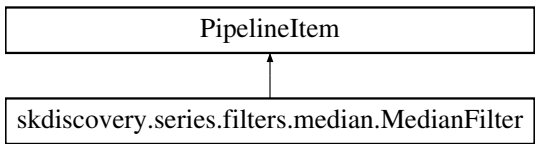
obj_data	Input panda's data series. Changes are made in place.

The documentation for this class was generated from the following file:

- table/filters/median.py

6.38 skdiscovery.series.filters.MedianFilter Class Reference

Inheritance diagram for skdiscovery.series.filters.MedianFilter:



Public Member Functions

- def __init__ (self, str_description, ap_paramList, interpolate=True, subtract=False)
- def process (self, obj_data)

6.38.1 Detailed Description

A Median filter for series data.

6.38.2 Constructor & Destructor Documentation

6.38.2.1 __init__()

```
def skdiscovery.series.filters.MedianFilter.__init__ (
              self,
              str_description,
              ap_paramList,
              interpolate = True,
              subtract = False )
```

Initialize MedianFilter.

Parameters

str_description	String describing filter
ap_paramList[ap_window]	median filter window width
interpolate	Flag to interpolate data points before filtering
subtract	Flag to subtract filtered result from original

6.38.3 Member Function Documentation

6.38.3.1 process()

```
def skdiscovery.series.filters.MedianFilter.process (
              self,
              obj_data )
```

Apply median filter to data set.

Parameters

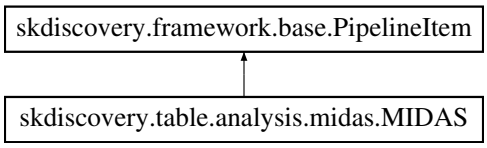
obj_data	Input DataWrapper. Changes are made in place.

The documentation for this class was generated from the following file:

- series/filters/median.py

6.39 skdiscovery.table.analysis.midas.MIDAS Class Reference

Inheritance diagram for skdiscovery.table.analysis.midas.MIDAS:



Public Member Functions

- def __init__ (self, str_description, column_names=None)
- def process (self, obj_data)
- def perturbParams (self)
- def resetParams (self)
- def __str__ (self)
- def getMetadata (self)

6.39.1 Constructor & Destructor Documentation

6.39.1.1 __init__()

```
def skdiscovery.table.analysis.midas.MIDAS.__init__ (
              self,
              str_description,
              column_names = None )
```

Initiatlize the MIDAS filtering item.

Parameters

obj_data	Data wrapper

6.39.2 Member Function Documentation

6.39.2.1 __str__()

```
def skdiscovery.framework.PipelineItem.__str__ (
              self )  [inherited]
```

String represntation of object.

Returns

String listing all currenter parameters

6.39.2.2 getMetadata()

```
def skdiscovery.framework.PipelineItem.getMetadata (
              self )  [inherited]
```

Retrieve metadata about filter.

Returns

String containing the item description and current parameters for filter.

6.39.2.3 perturbParams()

```
def skdiscovery.framework.PipelineItem.perturbParams (
              self )  [inherited]
```

choose other random value for all parameters

6.39.2.4 process()

```
def skdiscovery.table.analysis.midas.MIDAS.process (
              self,
              obj_data )
```

6.39.2.5 resetParams()

```
def skdiscovery.framework.PipelineItem.resetParams (
              self )  [inherited]
```

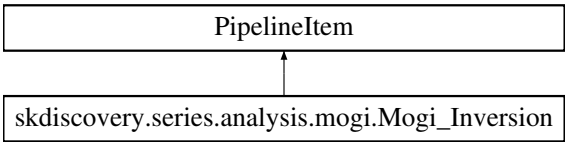
set all parameters to initial value

The documentation for this class was generated from the following file:

- table/analysis/midas.py

6.40 skdiscovery.series.analysis.Mogi_Inversion Class Reference

Inheritance diagram for skdiscovery.series.analysis.Mogi_Inversion:



Public Member Functions

- def __init__ (self, str_description, ap_paramList)
- def FitPCA (self, hPCA_Proj)
- def FitTimeSeries (self, pd_series, ct)
- def process (self, obj_data)

6.40.1 Detailed Description

Perform a Mogi source inversion on a set of gps series data.

The source is assumed to be a Mogi source (point source), but other source models can be selected. Assumes directions are named ('dN', 'dE', 'dU').

6.40.2 Constructor & Destructor Documentation

6.40.2.1 __init__()

```
def skdiscovery.series.analysis.Mogi_Inversion.__init__ (
              self,
              str_description,
              ap_paramList )
```

Initialize Mogi analysis item.

Parameters

str_description	Description of the item
ap_paramList[h_pca_name]	Name of the pca computed by General_Component_Analysis. Gets start and end date from the PCA fit.
ap_paramList[source_type]	Type of magma chamber source model to use (mogi [default],finite_sphere,closed_pipe,constant_open_pipe,rising_open_pipe,sill)

6.40.3 Member Function Documentation

6.40.3.1 FitPCA()

```
def skdiscovery.series.analysis.Mogi_Inversion.FitPCA (
              self,
              hPCA_Proj )
```

6.40.3.2 FitTimeSeries()

```
def skdiscovery.series.analysis.Mogi_Inversion.FitTimeSeries (
              self,
```

```
                pd_series,
                ct )
```

6.40.3.3 process()

```
def skdiscovery.series.analysis.Mogi_Inversion.process (
                self,
                obj_data )
```

Finds the magma source (default-mogi) from PBO GPS data.

Assumes time series columns are named ('dN', 'dE', 'dU'). Predictes location of the magma source using scipy.↩ optimize.curve_fit

The location of the magma source is stored in the data wrapper as a list res[0] = latitude res[1] = longitude res[2] = source depth (km) res[3] = volume change (meters^3) res[4] = extra parameters (depends on mogi fit type)

Parameters

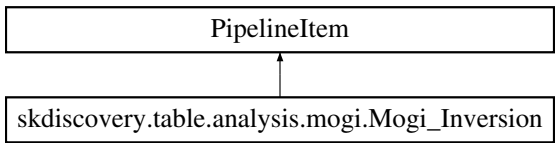
obj_data	Data object containing the results from the PCA stage

The documentation for this class was generated from the following file:

- series/analysis/mogi.py

6.41 skdiscovery.table.analysis.Mogi_Inversion Class Reference

Inheritance diagram for skdiscovery.table.analysis.Mogi_Inversion:



Public Member Functions

- def __init__ (self, str_description, ap_paramList, pca_name, column_names=['dN', dE, dU)
- def FitPCA (self, hPCA_Proj)
- def FitTimeSeries (self, pd_series, ct)
- def process (self, obj_data)

6.41.1 Detailed Description

Perform a mogi source inversion on a set of gps table data.

The source is assumed to be a mogi source (point source), but other source models can be selected. Assumes directions are named ('dN', 'dE', 'dU').

6.41.2 Constructor & Destructor Documentation

6.41.2.1 __init__()

```
def skdiscovery.table.analysis.Mogi_Inversion.__init__ (
              self,
              str_description,
              ap_paramList,
              pca_name,
              column_names = ['dN',
              dE,
              dU )
```

Initialize Mogi analysis item.

Parameters

str_description	Description of item
ap_paramList[source_type]	Type of magma chamber source model to use (default-mogi,finite_sphere,closed_pipe,constant_open_pipe,rising_open_pipe,sill)
pca_name	Name of pca result
column_names	The data direction column names

6.41.3 Member Function Documentation

6.41.3.1 FitPCA()

```
def skdiscovery.table.analysis.Mogi_Inversion.FitPCA (
              self,
              hPCA_Proj )
```

Determine the timing of the inflation event from the first component of the pca projection.

fits A $*$ arctan((t - t0) / c) + B to the first pca projection, in order to estimate source amplitude parameters

Parameters

hPCA_Proj	The sklearn PCA

Returns

ct: the t0, c, and B parameters from the fit
pA[0]: the fitted amplitude parameter

6.41.3.2 FitTimeSeries()

```
def skdiscovery.table.analysis.Mogi_Inversion.FitTimeSeries (
              self,
              pd_series,
              ct )
```

6.41.3.3 process()

```
def skdiscovery.table.analysis.Mogi_Inversion.process (
              self,
              obj_data )
```

Finds the magma source (default-mogi) from PBO GPS data.

Assumes time series columns are named ('dN', 'dE', 'dU'). Predicts the location of the magma source using scipy.↩ optimize.curve_fit

The result is added to the data wrapper as a list, with the four elements describing the location of the magma source: res[0] = latitude res[1] = longitude res[2] = source depth (km) res[3] = volume change (meters^3)

Parameters

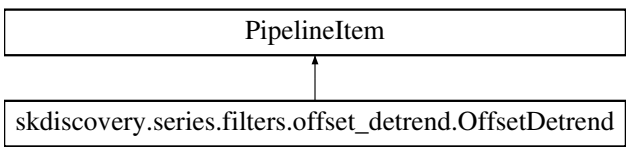
obj_data	

The documentation for this class was generated from the following file:

- table/analysis/mogi.py

6.42 skdiscovery.series.filters.OffsetDetrend Class Reference

Inheritance diagram for skdiscovery.series.filters.OffsetDetrend:



Public Member Functions

- def __init__ (self, str_description, ap_paramList=[], labels=None, column_names=None, time_point=None, time_interval=None)
- def process (self, obj_data)

6.42.1 Detailed Description

Trend filter that fits a stepwise function to linearly detrended series data.

On detrended data this filter fits a stepwise function (number of steps provided by the user) to correct the linear fit by accounting for discontinuous offsets, such as due to a change in the antenna or from an earthquake. The final linear fit handles each portion of the offset independently. If the number of discontinuities is not provided as an autoparam, the filter assumes a single discontinuity.

6.42.2 Constructor & Destructor Documentation

6.42.2.1 __init__()

```
def skdiscovery.series.filters.OffsetDetrend.__init__ (
              self,
              str_description,
              ap_paramList = [],
              labels = None,
              column_names = None,
              time_point = None,
              time_interval = None )
```

Initialize OffsetDetrend filter.

Parameters

str_description	String describing filter
ap_paramList[step_count]	Number of steps to remove from data (Default: 1)
labels	List of labels used to select data to be removed (using None will apply to all labels)
column_names	List of column names to select data to be removed (using None will apply to all columns)
time_point	Time of offset
time_interval	Interval within which the offset occurs

6.42.3 Member Function Documentation

6.42.3.1 process()

```
def skdiscovery.series.filters.OffsetDetrend.process (
              self,
              obj_data )
```

Apply offset estimation and detrending filter to data set.

Parameters

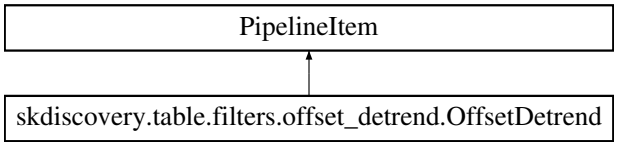
obj_data	Input data. Changes are made in place.

The documentation for this class was generated from the following file:

- series/filters/offset_detrend.py

6.43 skdiscovery.table.filters.OffsetDetrend Class Reference

Inheritance diagram for skdiscovery.table.filters.OffsetDetrend:



Public Member Functions

- def __init__ (self, str_description, column_names, ap_paramList=[], labels=None, time_point=None, time_interval=None)
- def process (self, obj_data)

6.43.1 Detailed Description

Trend filter that fits a stepwise function to linearly detrended table data.

On detrended data this filter fits a stepwise function (number of steps provided by the user) to correct the linear fit by accounting for discontinuous offsets, such as due to a change in the antenna or from an earthquake. The final linear fit handles each portion of the offset independently. If the number of discontinuities is not provided as an autoparam, the filter assumes a single discontinuity.

6.43.2 Constructor & Destructor Documentation

6.43.2.1 __init__()

```
def skdiscovery.table.filters.OffsetDetrend.__init__ (
              self,
              str_description,
              column_names,
              ap_paramList = [],
              labels = None,
              time_point = None,
              time_interval = None )
```

Initialize OffsetDetrend filter for use on table data.

Parameters

str_description	String describing filter
column_names	List of column names to select data to be removed (using None will apply to all columns)
ap_paramList[step_count]	Number of steps to remove from data (Default: 1)
labels	List of labels used to select data to be removed (using None will apply to all labels)
time_point	Time of offset
time_interval	Interval within which the offset occurs

6.43.3 Member Function Documentation

6.43.3.1 process()

```
def skdiscovery.table.filters.OffsetDetrend.process (
              self,
              obj_data )
```

Apply offset estimation and detrending filter to data set.

Parameters

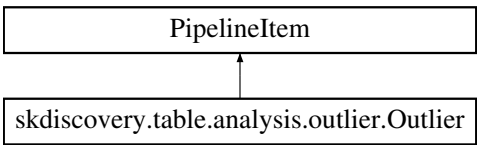
obj_data	Input data. Changes are made in place.

The documentation for this class was generated from the following file:

- table/filters/offset_detrend.py

6.44 skdiscovery.table.analysis.outlier.Outlier Class Reference

Inheritance diagram for skdiscovery.table.analysis.outlier.Outlier:



Public Member Functions

- def __init__ (self, str_description, columns=None, name_prefix='MAD_Scale_')
- def process (self, obj_data)

6.44.1 Constructor & Destructor Documentation

6.44.1.1 __init__()

```
def skdiscovery.table.analysis.outlier.Outlier.__init__ (
              self,
              str_description,
              columns = None,
              name_prefix = 'MAD_Scale_' )
```

Initalize Outlier Item.

Parameters

str_description	Name of Item
columns	List of of column names
new_column_name	Name of newly created column

6.44.2 Member Function Documentation

6.44.2.1 process()

```
def skdiscovery.table.analysis.outlier.Outlier.process (
              self,
              obj_data )
```

Process the data object to add a column with the outlier scores.

Parameters

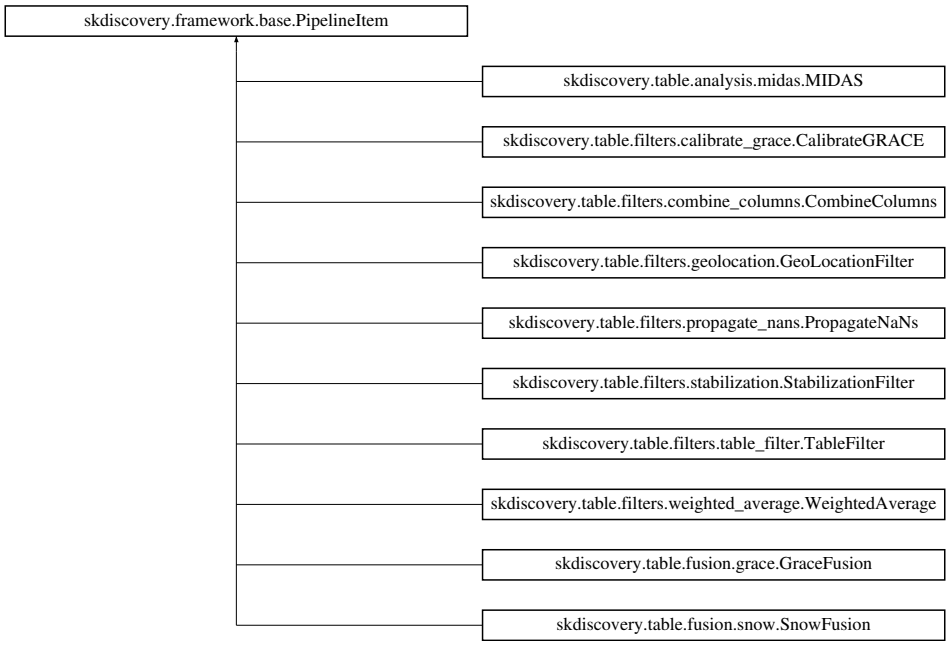
obj_data	Input table data wrapper

The documentation for this class was generated from the following file:

- table/analysis/outlier.py

6.45 skdiscovery.framework.PipelineItem Class Reference

Inheritance diagram for skdiscovery.framework.PipelineItem:



Public Member Functions

- def __init__ (self, str_description, ap_paramList=[])
- def perturbParams (self)
- def resetParams (self)
- def process (self, obj_data)
- def __str__ (self)
- def getMetadata (self)

6.45.1 Detailed Description

The general class used to create pipeline items.

6.45.2 Constructor & Destructor Documentation

6.45.2.1 __init__()

```
def skdiscovery.framework.PipelineItem.__init__ (
            self,
            str_description,
            ap_paramList = [] )
```

Initialize an object.

Parameters

str_description	String description of filter
ap_paramList	List of AutoParam parameters.

6.45.3 Member Function Documentation

6.45.3.1 __str__()

```
def skdiscovery.framework.PipelineItem.__str__ (
              self )
```

String represntation of object.

Returns

String listing all currenter parameters

6.45.3.2 getMetadata()

```
def skdiscovery.framework.PipelineItem.getMetadata (
              self )
```

Retrieve metadata about filter.

Returns

String containing the item description and current parameters for filter.

6.45.3.3 perturbParams()

```
def skdiscovery.framework.PipelineItem.perturbParams (
              self )
```

choose other random value for all parameters

6.45.3.4 process()

```
def skdiscovery.framework.PipelineItem.process (
              self,
              obj_data )
```

The actual filter processing.

Empty in this generic filter.

```
   @param obj_data: Data wrapper that will be processed
```

6.45.3.5 resetParams()

```
def skdiscovery.framework.PipelineItem.resetParams (
              self )
```

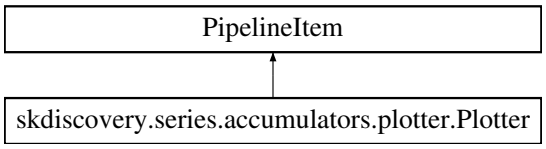
set all parameters to initial value

The documentation for this class was generated from the following file:

- framework/base.py

6.46 skdiscovery.series.accumulators.Plotter Class Reference

Inheritance diagram for skdiscovery.series.accumulators.Plotter:



Public Member Functions

- def __init__ (self, str_description, num_columns=3, errorbars=False, width=13, height=4, kwargs)
- def process (self, obj_data)

6.46.1 Detailed Description

Make a plot of series data.

6.46.2 Constructor & Destructor Documentation

6.46.2.1 __init__()

```
def skdiscovery.series.accumulators.Plotter.__init__ (
              self,
              str_description,
              num_columns = 3,
              errorbars = False,
              width = 13,
              height = 4,
              kwargs )
```

Initialize Plotter.

Parameters

str_description	String describing accumulator
num_columns	Number of columns to use when plotting data
errorbars	Flag indicating if errorbars should be used
width	Total width of all columns combined
height	Height of single row of plots
∗∗*kwargs*	Any additional keyword arguments are passed on to matplotlib

6.46.3 Member Function Documentation

6.46.3.1 process()

```
def skdiscovery.series.accumulators.Plotter.process (
              self,
              obj_data )
```

Plot each column in obj_

Parameters

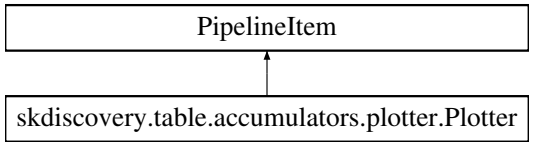
obj_data	Data Wrapper

The documentation for this class was generated from the following file:

- series/accumulators/plotter.py

6.47 skdiscovery.table.accumulators.Plotter Class Reference

Inheritance diagram for skdiscovery.table.accumulators.Plotter:



Public Member Functions

- def __init__ (self, str_description, column_names=None, error_column_names=None, num_columns=3, width=13, height=4, columns_together=False, annotate_column=None, annotate_data=None, xlim=None, ylim=None, kwargs)
- def process (self, obj_data)

6.47.1 Detailed Description

Make a plot of table data.

6.47.2 Constructor & Destructor Documentation

6.47.2.1 __init__()

```
def skdiscovery.table.accumulators.Plotter.__init__ (
              self,
              str_description,
              column_names = None,
              error_column_names = None,
              num_columns = 3,
              width = 13,
              height = 4,
              columns_together = False,
              annotate_column = None,
              annotate_data = None,
              xlim = None,
              ylim = None,
              kwargs )
```

Initialize Plotter.

Parameters

str_description	String describing accumulator
column_names	Columns to be plot
error_column_names	Columns containing uncertainties to be plot, no errorbars if None
num_columns	Number of columns to use when plotting data
width	Total width of all columns combined
height	Height of single row of plots
columns_together	If true, plot the columns on the same graph
annotate_column	Column of annotation data to use for annotation
annotate_data	Annotation data
∗∗*kwargs*	Any additional keyword arguments are passed on to matplotlib

6.47.3 Member Function Documentation

6.47.3.1 process()

```
def skdiscovery.table.accumulators.Plotter.process (
              self,
              obj_data )
```

Plot each column in obj_

Parameters

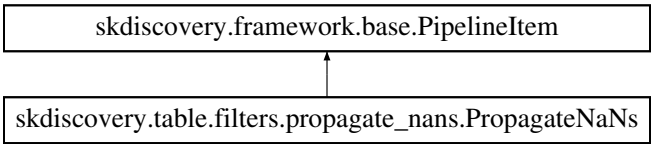
obj_data	Data Wrapper

The documentation for this class was generated from the following file:

- table/accumulators/plotter.py

6.48 skdiscovery.table.filters.propagate_nans.PropagateNaNs Class Reference

Inheritance diagram for skdiscovery.table.filters.propagate_nans.PropagateNaNs:



Public Member Functions

- def __init__ (self, str_description, nan_column, target_columns)
- def process (self, obj_data)
- def perturbParams (self)
- def resetParams (self)
- def __str__ (self)
- def getMetadata (self)

6.48.1 Detailed Description

Propagates NaN's from one column to other columns.

6.48.2 Constructor & Destructor Documentation

6.48.2.1 __init__()

```
def skdiscovery.table.filters.propagate_nans.PropagateNaNs.__init__ (
              self,
              str_description,
              nan_column,
              target_columns )
```

Initialize PropagateNaNs Filter.

Parameters

str_description	String describing filter
nan_column	Column used to select which rows should be NaN's
target_columns	Rows in these column will be set to NaN's based on nan_column

6.48.3 Member Function Documentation

6.48.3.1 __str__()

```
def skdiscovery.framework.PipelineItem.__str__ (
              self )  [inherited]
```

String represntation of object.

Returns

String listing all currenter parameters

6.48.3.2 getMetadata()

```
def skdiscovery.framework.PipelineItem.getMetadata (
              self )  [inherited]
```

Retrieve metadata about filter.

Returns

String containing the item description and current parameters for filter.

6.48.3.3 perturbParams()

```
def skdiscovery.framework.PipelineItem.perturbParams (
              self )  [inherited]
```

choose other random value for all parameters

6.48.3.4 process()

```
def skdiscovery.table.filters.propagate_nans.PropagateNaNs.process (
              self,
              obj_data )
```

PropagateNaNs on table data wrapper.

Parameters

obj_data	Input table data wrapper

6.48.3.5 resetParams()

```
def skdiscovery.framework.PipelineItem.resetParams (
              self )  [inherited]
```

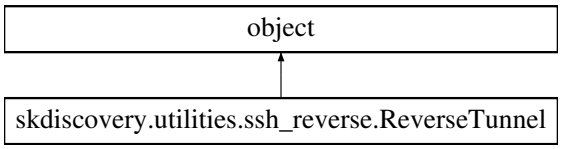
set all parameters to initial value

The documentation for this class was generated from the following file:

- table/filters/propagate_nans.py

6.49 skdiscovery.utilities.ssh_reverse.ReverseTunnel Class Reference

Inheritance diagram for skdiscovery.utilities.ssh_reverse.ReverseTunnel:



Public Member Functions

- def __init__ (self, server_address, username, key_filename, server_port, remote_host, remote_port, check=30, verbose=False)
- def create_reverse_tunnel (self)
- def __del__ (self)

6.49.1 Detailed Description

Create a reverse ssh tunnel.

6.49.2 Constructor & Destructor Documentation

6.49.2.1 __init__()

```
def skdiscovery.utilities.ssh_reverse.ReverseTunnel.__init__ (
              self,
              server_address,
              username,
              key_filename,
              server_port,
              remote_host,
              remote_port,
              check = 30,
              verbose = False )
```

Initialize ReverseTunnel object.

Parameters

server_address	Local server address
username	Valid username on remote host
key_filename	Filename of ssh key associated with remote host
server_port	Local port
remote_host	Address of remote host
remote_port	Remote port
check	Amount of time to wait in seconds when opening up a channel
verbose	Print status information

6.49.2.2 __del__()

```
def skdiscovery.utilities.ssh_reverse.ReverseTunnel.__del__ (
              self )
```

Deconstructor.

6.49.3 Member Function Documentation

6.49.3.1 create_reverse_tunnel()

```
def skdiscovery.utilities.ssh_reverse.ReverseTunnel.create_reverse_tunnel (
              self )
```

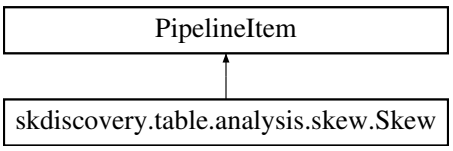
Create the reverse tunnel.

The documentation for this class was generated from the following file:

- utilities/ssh_reverse.py

6.50 skdiscovery.table.analysis.skew.Skew Class Reference

Inheritance diagram for skdiscovery.table.analysis.skew.Skew:



Public Member Functions

- def process (self, obj_data)

6.50.1 Detailed Description

Calculates the skew of table data.

6.50.2 Member Function Documentation

6.50.2.1 process()

```
def skdiscovery.table.analysis.skew.Skew.process (
              self,
              obj_data )
```

Apply Skew analysis with results added to the data wrapper.

Parameters

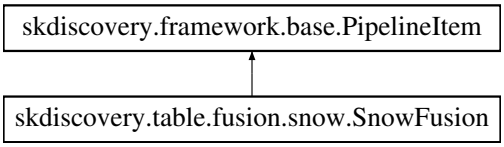
obj_data	Data wrapper

The documentation for this class was generated from the following file:

- table/analysis/skew.py

6.51 skdiscovery.table.fusion.SnowFusion Class Reference

Inheritance diagram for skdiscovery.table.fusion.SnowFusion:



Public Member Functions

- def __init__ (self, str_description, metadata, column_data_name='Snow')
- def process (self, obj_data)
- def perturbParams (self)
- def resetParams (self)
- def __str__ (self)
- def getMetadata (self)

6.51.1 Detailed Description

Adds snow time series data to table based on geographic coordinates.

Works on table data (original data from http://nsidc.org/data/g02156)

6.51.2 Constructor & Destructor Documentation

6.51.2.1 __init__()

```
def skdiscovery.table.fusion.SnowFusion.__init__ (
              self,
              str_description,
              metadata,
              column_data_name = 'Snow' )
```

Initialize Snow Fusion item.

Parameters

str_description	String describing item
metadata	Metadata that contains lat,lon coordinates based on data labels
column_data_name	Name of column for Snow data

6.51.3 Member Function Documentation

6.51.3.1 __str__()

```
def skdiscovery.framework.PipelineItem.__str__ (
```

```
              self )  [inherited]
```

String represntation of object.

Returns

String listing all currenter parameters

6.51.3.2 getMetadata()

```
def skdiscovery.framework.PipelineItem.getMetadata (
              self )  [inherited]
```

Retrieve metadata about filter.

Returns

String containing the item description and current parameters for filter.

6.51.3.3 perturbParams()

```
def skdiscovery.framework.PipelineItem.perturbParams (
              self )  [inherited]
```

choose other random value for all parameters

6.51.3.4 process()

```
def skdiscovery.table.fusion.SnowFusion.process (
              self,
              obj_data )
```

Adds column for snow (g02156) data.

Parameters

obj_data	Input DataWrapper, will be modified in place

6.51.3.5 resetParams()

```
def skdiscovery.framework.PipelineItem.resetParams (
              self )  [inherited]
```

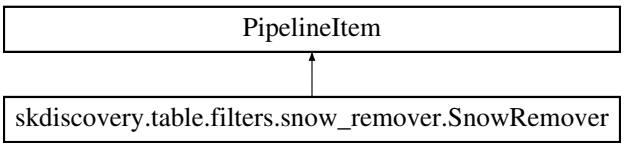
set all parameters to initial value

The documentation for this class was generated from the following file:

- table/fusion/snow.py

6.52 skdiscovery.table.filters.SnowRemover Class Reference

Inheritance diagram for skdiscovery.table.filters.SnowRemover:



Public Member Functions

- def __init__ (self, str_description, ap_paramList=[AutoParam(1.5)], column_name='dN', snow_column='Snow')
- def process (self, obj_data)

6.52.1 Detailed Description

Removes data with snow errors.

6.52.2 Constructor & Destructor Documentation

6.52.2.1 __init__()

```
def skdiscovery.table.filters.SnowRemover.__init__ (
              self,
              str_description,
              ap_paramList = [AutoParam(1.5)],
              column_name = 'dN',
              snow_column = 'Snow' )
```

Initialize snow remover for use on table data.

Parameters

str_description	String describing filter
ap_paramList[sigma_clip]	remove station if the stddev of snowdays is sigma_clip times greater than non-snow days, default 1.5
column_name	Name of column to check
snow_column	Name of snow column to determine snowdays/non snow days

6.52.3 Member Function Documentation

6.52.3.1 process()

```
def skdiscovery.table.filters.SnowRemover.process (
              self,
              obj_data )
```

Removes table data with large snow errors.

Parameters

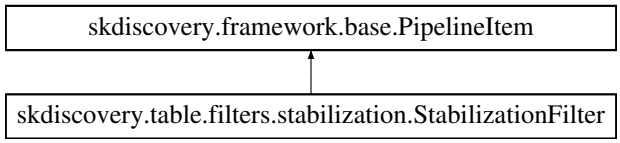
obj_data	Input DataWrapper, will be modified in place

The documentation for this class was generated from the following file:

- table/filters/snow_remover.py

6.53 skdiscovery.table.filters.stabilization.StabilizationFilter Class Reference

Inheritance diagram for skdiscovery.table.filters.stabilization.StabilizationFilter:



Public Member Functions

- def process (self, obj_data)
- def perturbParams (self)
- def resetParams (self)
- def __str__ (self)
- def getMetadata (self)

6.53.1 Detailed Description

This filter transforms GPS stations in a region to a local reference frame.

6.53.2 Member Function Documentation

6.53.2.1 __str__()

```
def skdiscovery.framework.PipelineItem.__str__ (
              self )  [inherited]
```

String represntation of object.

Returns

String listing all currenter parameters

6.53.2.2 getMetadata()

```
def skdiscovery.framework.PipelineItem.getMetadata (
              self )  [inherited]
```

Retrieve metadata about filter.

Returns

String containing the item description and current parameters for filter.

6.53.2.3 perturbParams()

```
def skdiscovery.framework.PipelineItem.perturbParams (
              self )  [inherited]
```

choose other random value for all parameters

6.53.2.4 process()

```
def skdiscovery.table.filters.stabilization.StabilizationFilter.process (
              self,
              obj_data )
```

Apply stabilization filter to data set.

Parameters

obj_data	Table data wrapper.

6.53.2.5 resetParams()

```
def skdiscovery.framework.PipelineItem.resetParams (
              self )  [inherited]
```

set all parameters to initial value

The documentation for this class was generated from the following file:

- table/filters/stabilization.py

6.54 skdiscovery.framework.StageContainer Class Reference

Public Member Functions

- def __init__ (self, obj_content, obj_runmethod=None, obj_perturbmethod=None, obj_reset=None)
- def run (self, obj_data_container)
- def perturb (self)
- def reset (self)
- def getMetadata (self)
- def getObjects (self)
- def getMetadataType (self)
- def getMetadataNestedTypes (self)
- def getMetadataNestedGraph (self)

6.54.1 Detailed Description

Container to hold a stage for the DiscoveryPipeline.

6.54.2 Constructor & Destructor Documentation

6.54.2.1 __init__()

```
def skdiscovery.framework.StageContainer.__init__ (
              self,
              obj_content,
              obj_runmethod = None,
              obj_perturbmethod = None,
              obj_reset = None )
```

Get the object and its run method into this conainer.

Parameters

obj_content	filter, analysis, or accumlator
obj_runmethod	Run method of the obj_content (default process)
obj_perturbmethod	Perturb method of the obj_content (default peturbParams)
obj_reset	Reset method of the obj_content (default resetParams)

6.54.3 Member Function Documentation

6.54.3.1 getMetadata()

```
def skdiscovery.framework.StageContainer.getMetadata (
              self )
```

Retrieves the obj_content metadata.

Returns

obj_content metadata

6.54.3.2 getMetadataNestedGraph()

```
def skdiscovery.framework.StageContainer.getMetadataNestedGraph (
              self )
```

Get the nested graph for the container.

Returns

String: Stage container subgraph

6.54.3.3 getMetadataNestedTypes()

```
def skdiscovery.framework.StageContainer.getMetadataNestedTypes (
              self )
```

Get the metadata along with container type.

Returns

string of container and metadata

6.54.3.4 getMetadataType()

```
def skdiscovery.framework.StageContainer.getMetadataType (
              self )
```

Get metadata type.

Returns

String: container type

6.54.3.5 getObjects()

```
def skdiscovery.framework.StageContainer.getObjects (
              self )
```

Return the obj_content in a list.

Returns

Contained object in a list

6.54.3.6 perturb()

```
def skdiscovery.framework.StageContainer.perturb (
              self )
```

Execute the obj_content peturb method.

6.54.3.7 reset()

```
def skdiscovery.framework.StageContainer.reset (
              self )
```

Execute the obj_content reset method.

6.54.3.8 run()

```
def skdiscovery.framework.StageContainer.run (
              self,
              obj_data_container )
```

Execute the obj_content run method.

Parameters

obj_data_container	Data container to be passed to the held obj_content's run method

The documentation for this class was generated from the following file:

- framework/stagecontainers.py

6.55 skdiscovery.framework.StageContainerAlternative Class Reference

Public Member Functions

- def __init__ (self, list_stagecontainers)
- def run (self, obj_data_container)
- def perturb (self)
- def getMetadata (self)
- def getObjects (self)
- def reset (self)
- def getMetadataType (self)
- def getMetadataNestedTypes (self)
- def getMetadataNestedGraph (self)

Static Public Attributes

- list currentContainer = [ ]

6.55.1 Detailed Description

Stage Container that holds a list of stage containers and randomly chooses one to use.

6.55.2 Constructor & Destructor Documentation

6.55.2.1 __init__()

```
def skdiscovery.framework.StageContainerAlternative.__init__ (
              self,
              list_stagecontainers )
```

Initialize the StageContainerAlternative.

Parameters

list_stagecontainers	List of stage containers

6.55.3 Member Function Documentation

6.55.3.1 getMetadata()

```
def skdiscovery.framework.StageContainerAlternative.getMetadata (
              self )
```

Return metadata from the current container.

Returns

metadata from the currently selected container

6.55.3.2 getMetadataNestedGraph()

```
def skdiscovery.framework.StageContainerAlternative.getMetadataNestedGraph (
              self )
```

Get the nested graph for the container.

Returns

String: Container subgraph

6.55.3.3 getMetadataNestedTypes()

```
def skdiscovery.framework.StageContainerAlternative.getMetadataNestedTypes (
              self )
```

Get the metadata along with container type.

Returns

string of container and metadata

6.55.3.4 getMetadataType()

```
def skdiscovery.framework.StageContainerAlternative.getMetadataType (
              self )
```

Get metadata type.

Returns

String: container type

6.55.3.5 getObjects()

```
def skdiscovery.framework.StageContainerAlternative.getObjects (
              self )
```

retrieve the current container as a list

Returns

Current container being used as a list

6.55.3.6 perturb()

```
def skdiscovery.framework.StageContainerAlternative.perturb (
              self )
```

choose one of the containers as an alternative and perturb its parameters

6.55.3.7 reset()

```
def skdiscovery.framework.StageContainerAlternative.reset (
              self )
```

6.55.3.8 run()

```
def skdiscovery.framework.StageContainerAlternative.run (
              self,
              obj_data_container )
```

Run the currently selected stage container.

Parameters

obj_datacontainer	Data container to be passed to the current stagecontainer

The documentation for this class was generated from the following file:

- framework/stagecontainers.py

6.56 skdiscovery.framework.StageContainerIncrementalAdd Class Reference

Public Member Functions

- def __init__ (self, list_stagecontainers)
- def reset (self)
- def run (self, obj_data_container)
- def perturb (self)
- def getMetadata (self)
- def getObjects (self)
- def getMetadataType (self)
- def getMetadataNestedTypes (self)
- def getMetadataNestedGraph (self)

Static Public Attributes

- int length = 0
- int currentindex = 0
- list list_currentContainers = [ ]

6.56.1 Detailed Description

In each perturb call, it incrementally adds one of the filters specified in the constructor.

6.56.2 Constructor & Destructor Documentation

6.56.2.1 __init__()

```
def skdiscovery.framework.StageContainerIncrementalAdd.__init__ (
              self,
              list_stagecontainers )
```

Initialize the container.

Parameters

list_stagecontainers	List of stage containers.

6.56.3 Member Function Documentation

6.56.3.1 getMetadata()

```
def skdiscovery.framework.StageContainerIncrementalAdd.getMetadata (
              self )
```

Return the metadata from the currently used stage containers.

Returns

List of metadata from current containers

6.56.3.2 getMetadataNestedGraph()

```
def skdiscovery.framework.StageContainerIncrementalAdd.getMetadataNestedGraph (
              self )
```

Get the nested graph for the container.

Returns

String: Container subgraph

6.56.3.3 getMetadataNestedTypes()

```
def skdiscovery.framework.StageContainerIncrementalAdd.getMetadataNestedTypes (
              self )
```

Get the metadata along with container type.

Returns

string of container and metadata

6.56.3.4 getMetadataType()

```
def skdiscovery.framework.StageContainerIncrementalAdd.getMetadataType (
              self )
```

Get metadata type.

Returns

String: container type

6.56.3.5 getObjects()

```
def skdiscovery.framework.StageContainerIncrementalAdd.getObjects (
              self )
```

Retrieve objects in the current list of stage containers.

Returns

List of current obj_content from the current list of stage containers

6.56.3.6 perturb()

```
def skdiscovery.framework.StageContainerIncrementalAdd.perturb (
              self )
```

Add another stage container to the current list of stage containers.

6.56.3.7 reset()

```
def skdiscovery.framework.StageContainerIncrementalAdd.reset (
              self )
```

Reset the container so that it will only run the first stage container again.

6.56.3.8 run()

```
def skdiscovery.framework.StageContainerIncrementalAdd.run (
              self,
              obj_data_container )
```

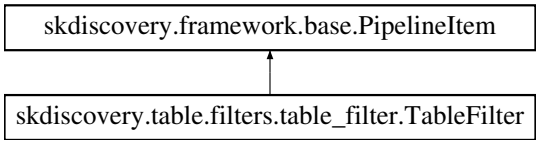
Run the current list of stage containers.

The documentation for this class was generated from the following file:

- framework/stagecontainers.py

6.57 skdiscovery.table.filters.table_filter.TableFilter Class Reference

Inheritance diagram for skdiscovery.table.filters.table_filter.TableFilter:



Public Member Functions

- def __init__ (self, str_description, ap_paramList)
- def process (self, obj_data)
- def perturbParams (self)
- def resetParams (self)
- def __str__ (self)
- def getMetadata (self)

6.57.1 Detailed Description

This class removes tables based on their label.

6.57.2 Constructor & Destructor Documentation

6.57.2.1 __init__()

```
def skdiscovery.table.filters.table_filter.TableFilter.__init__ (
              self,
              str_description,
              ap_paramList )
```

Initialize Table FIlter.

Parameters

str_description	String describing this filter
ap_paramList[ap_label_list]	AutoList of table labels to remove

6.57.3 Member Function Documentation

6.57.3.1 __str__()

```
def skdiscovery.framework.PipelineItem.__str__ (
              self )  [inherited]
```

String represntation of object.

Returns

String listing all currenter parameters

6.57.3.2 getMetadata()

```
def skdiscovery.framework.PipelineItem.getMetadata (
              self )  [inherited]
```

Retrieve metadata about filter.

Returns

String containing the item description and current parameters for filter.

6.57.3.3 perturbParams()

```
def skdiscovery.framework.PipelineItem.perturbParams (
              self )  [inherited]
```

choose other random value for all parameters

6.57.3.4 process()

```
def skdiscovery.table.filters.table_filter.TableFilter.process (
              self,
              obj_data )
```

Apply geolocation filter to data set.

Parameters

obj_data	Table data wrapper

6.57.3.5 resetParams()

```
def skdiscovery.framework.PipelineItem.resetParams (
              self )  [inherited]
```

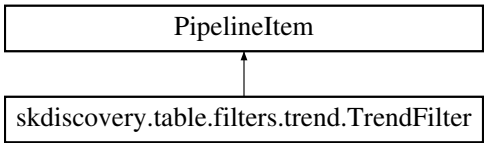
set all parameters to initial value

The documentation for this class was generated from the following file:

- table/filters/table_filter.py

6.58 skdiscovery.table.filters.TrendFilter Class Reference

Inheritance diagram for skdiscovery.table.filters.TrendFilter:



Public Member Functions

- def __init__ (self, str_description, ap_paramList, columns=None)
- def process (self, obj_data)

6.58.1 Detailed Description

Trend Filter that removes linear and sinusoidal (annual, semi-annual) trends on series data.

Works on table data

6.58.2 Constructor & Destructor Documentation

6.58.2.1 __init__()

```
def skdiscovery.table.filters.TrendFilter.__init__ (
              self,
              str_description,
              ap_paramList,
              columns = None )
```

Initialize Trend Filter.

Parameters

str_description	String describing filter [list_trendTypes]: List of trend types. List can contain "linear", "annual", or "semiannual"

6.58.3 Member Function Documentation

6.58.3.1 process()

```
def skdiscovery.table.filters.TrendFilter.process (
              self,
              obj_data )
```

Apply trend filter to data set.

Parameters

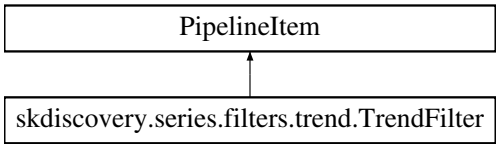
obj_data	Input data. Changes are made in place.

The documentation for this class was generated from the following file:

- table/filters/trend.py

6.59 skdiscovery.series.filters.TrendFilter Class Reference

Inheritance diagram for skdiscovery.series.filters.TrendFilter:



Public Member Functions

- def __init__ (self, str_description, ap_paramList)
- def process (self, obj_data)

6.59.1 Detailed Description

Trend Filter that removes linear and sinusoidal (annual, semi-annual) trends on series data.

6.59.2 Constructor & Destructor Documentation

6.59.2.1 __init__()

```
def skdiscovery.series.filters.TrendFilter.__init__ (
              self,
              str_description,
              ap_paramList )
```

Initialize Trend Filter.

Parameters

str_description	String describing filter
ap_paramList[list_trendTypes]	List of trend types. List can contain any mix of "linear", "annual", or "semiannual". The default is to remove the linear, annual, and semiannual trends

6.59.3 Member Function Documentation

6.59.3.1 process()

```
def skdiscovery.series.filters.TrendFilter.process (
              self,
              obj_data )
```

Apply trend filter to data set.

Parameters

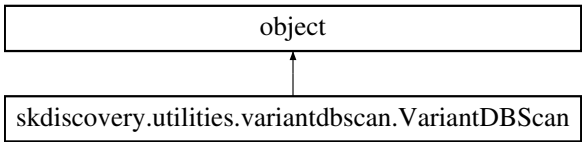
obj_data	Input data. Changes are made in place.

The documentation for this class was generated from the following file:

- series/filters/trend.py

6.60 skdiscovery.utilities.VariantDBScan Class Reference

Inheritance diagram for skdiscovery.utilities.VariantDBScan:



Public Member Functions

- def __init__ (self, variants, data, column_names)
- def run (self, verbose=False)

6.60.1 Detailed Description

Wrapper for VariantDBScan.

6.60.2 Constructor & Destructor Documentation

6.60.2.1 __init__()

```
def skdiscovery.utilities.VariantDBScan.__init__ (
              self,
              variants,
              data,
              column_names )
```

Initialize DBScan pipeline item.

Parameters

variants	DataFrame of epsilon (label column 'eps') and minpoints (label column 'mp')
data	Data Pandas DataFrame to be clustered
column_names	List of column names in DataFrame to cluster (Can be 2 or 3 columns)

6.60.3 Member Function Documentation

6.60.3.1 run()

```
def skdiscovery.utilities.VariantDBScan.run (
              self,
              verbose = False )
```

Runs VariantDBScan on data.

Parameters

verbose	Print additional information about run

Returns

a dataframe with a column for each dbscan run which contains the cluster id for each object.

Note

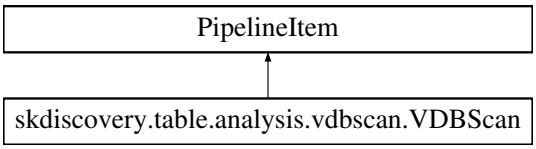
A value of 0 indicates object is a noise point

The documentation for this class was generated from the following file:

- utilities/variantdbscan.py

6.61 skdiscovery.table.analysis.VDBScan Class Reference

Inheritance diagram for skdiscovery.table.analysis.VDBScan:



Public Member Functions

- def __init__ (self, str_description, variants, column_names)
- def process (self, obj_data)

6.61.1 Detailed Description

Runs Variant DBscan on table data.

Adds cluster information columns to data

6.61.2 Constructor & Destructor Documentation

6.61.2.1 __init__()

```
def skdiscovery.table.analysis.VDBScan.__init__ (
              self,
              str_description,
              variants,
              column_names )
```

Initialize VDBScan pipelne item.

Parameters

str_description	Description of item
variants	Dataframe containing column of epsilon values and column of min points
column_names	List of column names to use

6.61.3 Member Function Documentation

6.61.3.1 process()

```
def skdiscovery.table.analysis.VDBScan.process (
              self,
              obj_data )
```

Run VDBScan on data.

Parameters

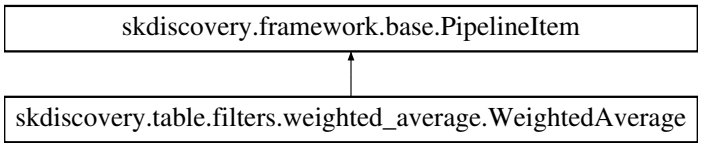
obj_data	Data wrapper to process

The documentation for this class was generated from the following file:

- table/analysis/vdbscan.py

6.62 skdiscovery.table.filters.weighted_average.WeightedAverage Class Reference

Inheritance diagram for skdiscovery.table.filters.weighted_average.WeightedAverage:



Public Member Functions

- def __init__ (self, str_description, ap_paramList, column_names, std_dev_column_names=None)
- def process (self, obj_data)
- def perturbParams (self)
- def resetParams (self)
- def __str__ (self)
- def getMetadata (self)

6.62.1 Detailed Description

This filter performs a rolling weighted average using standard deviations as weight.

6.62.2 Constructor & Destructor Documentation

6.62.2.1 __init__()

```
def skdiscovery.table.filters.weighted_average.WeightedAverage.__init__ (
              self,
              str_description,
              ap_paramList,
              column_names,
              std_dev_column_names = None )
```

Initializes a WeightedAverage object.

Parameters

str_description	String describing filter
ap_paramList[window]	Window to use for computing rolling weighted average
column_names	Names of columns to apply the weighted average
std_dev_column_names	Names of columns of the standard deviations. If none a regular mean is computed.

6.62.3 Member Function Documentation

6.62.3.1 __str__()

```
def skdiscovery.framework.PipelineItem.__str__ (
              self )  [inherited]
```

String represntation of object.

Returns

String listing all currenter parameters

6.62.3.2 getMetadata()

```
def skdiscovery.framework.PipelineItem.getMetadata (
              self )  [inherited]
```

Retrieve metadata about filter.

Returns

String containing the item description and current parameters for filter.

6.62.3.3 perturbParams()

```
def skdiscovery.framework.PipelineItem.perturbParams (
              self )  [inherited]
```

choose other random value for all parameters

6.62.3.4 process()

```
def skdiscovery.table.filters.weighted_average.WeightedAverage.process (
              self,
              obj_data )
```

6.62.3.5 resetParams()

```
def skdiscovery.framework.PipelineItem.resetParams (
              self )  [inherited]
```

set all parameters to initial value

The documentation for this class was generated from the following file:

- table/filters/weighted_average.py

Chapter 7

File Documentation

7.1 framework/base.py File Reference

Classes

- class skdiscovery.framework.PipelineItem

Namespaces

- skdiscovery.framework.base

7.2 framework/discoverypipeline.py File Reference

Classes

- class skdiscovery.DiscoveryPipeline

Namespaces

- skdiscovery.framework.discoverypipeline

7.3 framework/param.py File Reference

Classes

- class skdiscovery.framework.param.AutoParam
- class skdiscovery.framework.param.AutoParamMinMax
- class skdiscovery.framework.param.AutoParamMinMaxExtreme
- class skdiscovery.framework.param.AutoParamList
- class skdiscovery.framework.param.AutoParamListCycle
- class skdiscovery.framework.param.AutoList
- class skdiscovery.framework.param.AutoListSubset
- class skdiscovery.framework.param.AutoListPermute
- class skdiscovery.framework.param.AutoListRemove
- class skdiscovery.framework.param.AutoListCycle

Namespaces

- skdiscovery.framework.param
- AlgoParam

7.4 framework/stagecontainers.py File Reference

Classes

- class skdiscovery.framework.StageContainer
- class skdiscovery.framework.StageContainerAlternative
- class skdiscovery.framework.StageContainerIncrementalAdd

Namespaces

- skdiscovery.framework.stagecontainers

7.5 generic/accumulators/data.py File Reference

Classes

- class skdiscovery.generic.accumulators.DataAccumulator

Namespaces

- skdiscovery.generic.accumulators.data

7.6 generic/accumulators/gpshplotter.py File Reference

Classes

- class skdiscovery.generic.accumulators.GPSHPlotter

Namespaces

- skdiscovery.generic.accumulators.gpshplotter

7.7 generic/accumulators/hcluster.py File Reference

Classes

- class skdiscovery.generic.accumulators.HCluster

Namespaces

- skdiscovery.generic.accumulators.hcluster

7.8 series/accumulators/plotter.py File Reference

Classes

- class skdiscovery.series.accumulators.Plotter

Namespaces

- skdiscovery.series.accumulators.plotter

7.9 table/accumulators/plotter.py File Reference

Classes

- class skdiscovery.table.accumulators.Plotter

Namespaces

- skdiscovery.table.accumulators.plotter

7.10 series/analysis/correlate.py File Reference

Classes

- class skdiscovery.series.analysis.Correlate

Namespaces

- skdiscovery.series.analysis.correlate

7.11 table/analysis/correlate.py File Reference

Classes

- class skdiscovery.table.analysis.Correlate

Namespaces

- skdiscovery.table.analysis.correlate

7.12 series/analysis/gca.py File Reference

Classes

- class skdiscovery.series.analysis.General_Component_Analysis

Namespaces

- skdiscovery.series.analysis.gca

7.13 table/analysis/gca.py File Reference

Classes

- class skdiscovery.table.analysis.General_Component_Analysis

Namespaces

- skdiscovery.table.analysis.gca

7.14 series/analysis/mogi.py File Reference

Classes

- class skdiscovery.series.analysis.Mogi_Inversion

Namespaces

- skdiscovery.series.analysis.mogi

Functions

- def skdiscovery.series.analysis.MogiVectors (mogi_res, station_lat_list, station_lon_list, flag3D=False)

7.15 table/analysis/mogi.py File Reference

Classes

- class skdiscovery.table.analysis.Mogi_Inversion

Namespaces

- skdiscovery.table.analysis.mogi

Functions

- def skdiscovery.table.analysis.MogiVectors (mogi_res, station_lat_list, station_lon_list, flag3D=False)

7.16 series/filters/dataremover.py File Reference

Classes

- class skdiscovery.series.filters.DataRemover

Namespaces

- skdiscovery.series.filters.dataremover

7.17 table/filters/dataremover.py File Reference

Classes

- class skdiscovery.table.filters.DataRemover

Namespaces

- skdiscovery.table.filters.dataremover

7.18 series/filters/hyperbolictan.py File Reference

Classes

- class skdiscovery.series.filters.HTanFilter

Namespaces

- skdiscovery.series.filters.hyperbolictan

7.19 table/filters/hyperbolictan.py File Reference

Classes

- class skdiscovery.table.filters.HTanFilter

Namespaces

- skdiscovery.table.filters.hyperbolictan

7.20 series/filters/interpolate.py File Reference

Classes

- class skdiscovery.series.filters.InterpolateFilter

Namespaces

- skdiscovery.series.filters.interpolate

7.21 table/filters/interpolate.py File Reference

Classes

- class skdiscovery.table.filters.InterpolateFilter

Namespaces

- skdiscovery.table.filters.interpolate

7.22 series/filters/kalman.py File Reference

Classes

- class skdiscovery.series.filters.KalmanFilter

Namespaces

- skdiscovery.series.filters.kalman

7.23 table/filters/kalman.py File Reference

Classes

- class skdiscovery.table.filters.KalmanFilter

Namespaces

- skdiscovery.table.filters.kalman

7.24 series/filters/lowpass.py File Reference

Classes

- class skdiscovery.series.filters.LowPassFilter

Namespaces

- skdiscovery.series.filters.lowpass

7.25 table/filters/lowpass.py File Reference

Classes

- class skdiscovery.table.filters.LowPassFilter

Namespaces

- skdiscovery.table.filters.lowpass

7.26 series/filters/median.py File Reference

Classes

- class skdiscovery.series.filters.MedianFilter

Namespaces

- skdiscovery.series.filters.median

7.27 table/filters/median.py File Reference

Classes

- class skdiscovery.table.filters.MedianFilter

Namespaces

- skdiscovery.table.filters.median

7.28 series/filters/offset_detrend.py File Reference

Classes

- class skdiscovery.series.filters.OffsetDetrend

Namespaces

- skdiscovery.series.filters.offset_detrend

7.29 table/filters/offset_detrend.py File Reference

Classes

- class skdiscovery.table.filters.OffsetDetrend

Namespaces

- skdiscovery.table.filters.offset_detrend

7.30 series/filters/trend.py File Reference

Classes

- class skdiscovery.series.filters.TrendFilter

Namespaces

- skdiscovery.series.filters.trend

7.31 table/filters/trend.py File Reference

Classes

- class skdiscovery.table.filters.TrendFilter

Namespaces

- skdiscovery.table.filters.trend

7.32 table/analysis/dbscan.py File Reference

Classes

- class skdiscovery.table.analysis.dbscan.DBScan

Namespaces

- skdiscovery.table.analysis.dbscan

7.33 table/analysis/midas.py File Reference

Classes

- class skdiscovery.table.analysis.midas.MIDAS

Namespaces

- skdiscovery.table.analysis.midas

7.34 table/analysis/outlier.py File Reference

Classes

- class skdiscovery.table.analysis.outlier.Outlier

Namespaces

- skdiscovery.table.analysis.outlier

7.35 table/analysis/skew.py File Reference

Classes

- class skdiscovery.table.analysis.skew.Skew

Namespaces

- skdiscovery.table.analysis.skew

7.36 table/analysis/vdbscan.py File Reference

Classes

- class skdiscovery.table.analysis.VDBScan

Namespaces

- skdiscovery.table.analysis.vdbscan

7.37 table/filters/antenna_offset.py File Reference

Classes

- class skdiscovery.table.filters.antenna_offset.AntennaOffset

Namespaces

- skdiscovery.table.filters.antenna_offset

7.38 table/filters/calibrate_py File Reference

Classes

- class skdiscovery.table.filters.calibrate_CalibrateGRACE

Namespaces

- skdiscovery.table.filters.calibrate_grace

7.39 table/filters/combine_columns.py File Reference

Classes

- class skdiscovery.table.filters.combine_columns.CombineColumns

Namespaces

- skdiscovery.table.filters.combine_columns

7.40 table/filters/geolocation.py File Reference

Classes

- class skdiscovery.table.filters.geolocation.GeoLocationFilter

Namespaces

- skdiscovery.table.filters.geolocation

7.41 table/filters/propagate_nans.py File Reference

Classes

- class skdiscovery.table.filters.propagate_nans.PropagateNaNs

Namespaces

- skdiscovery.table.filters.propagate_nans

7.42 table/filters/snow_remover.py File Reference

Classes

- class skdiscovery.table.filters.SnowRemover

Namespaces

- skdiscovery.table.filters.snow_remover

7.43 table/filters/stabilization.py File Reference

Classes

- class skdiscovery.table.filters.stabilization.StabilizationFilter

Namespaces

- skdiscovery.table.filters.stabilization

7.44 table/filters/table_filter.py File Reference

Classes

- class skdiscovery.table.filters.table_filter.TableFilter

Namespaces

- skdiscovery.table.filters.table_filter

7.45 table/filters/weighted_average.py File Reference

Classes

- class skdiscovery.table.filters.weighted_average.WeightedAverage

Namespaces

- skdiscovery.table.filters.weighted_average

7.46 table/fusion/grace.py File Reference

Classes

- class skdiscovery.table.fusion.GraceFusion

Namespaces

- skdiscovery.table.fusion.grace

7.47 table/fusion/snow.py File Reference

Classes

- class skdiscovery.table.fusion.SnowFusion

Namespaces

- skdiscovery.table.fusion.snow

7.48 table/generators/catalog_generator.py File Reference

Classes

- class skdiscovery.table.generators.catalog_generator.CatalogGenerator

Namespaces

- skdiscovery.table.generators.catalog_generator

7.49 table/generators/data_generator.py File Reference

Classes

- class skdiscovery.table.generators.data_generator.DataGenerator

Namespaces

- skdiscovery.table.generators.data_generator

7.50 utilities/amazon_control.py File Reference

Namespaces

- skdiscovery.utilities.amazon_control

Functions

- def skdiscovery.utilities.amazon_control.init (in_aws_access_key, in_aws_secret, in_aws_region, in_aws_↩ security_group, in_aws_key_name, in_pem_file)
- def skdiscovery.utilities.amazon_control.closeDispyScheduler ()
- def skdiscovery.utilities.amazon_control.startDispyScheduler ()
- def skdiscovery.utilities.amazon_control.generateInfo (instance)
- def skdiscovery.utilities.amazon_control.updateStatus ()
- def skdiscovery.utilities.amazon_control.setNumInstances (new_total_instances, instance_type, image_id)
- def skdiscovery.utilities.amazon_control.createTunnels ()
- def skdiscovery.utilities.amazon_control.startDispyNode ()
- def skdiscovery.utilities.amazon_control.resetInstances ()
- def skdiscovery.utilities.amazon_control.reset ()
- def skdiscovery.utilities.amazon_control.close ()
- def skdiscovery.utilities.amazon_control.clearAmazonList ()

Variables

- skdiscovery.utilities.amazon_control.aws_access_key = None
- skdiscovery.utilities.amazon_control.aws_secret = None
- skdiscovery.utilities.amazon_control.aws_region = None
- skdiscovery.utilities.amazon_control.aws_security_group = None
- skdiscovery.utilities.amazon_control.aws_key_name = None
- skdiscovery.utilities.amazon_control.pem_file = None
- skdiscovery.utilities.amazon_control.ec2_res = None
- skdiscovery.utilities.amazon_control.ec2_client = None
- list skdiscovery.utilities.amazon_control.amazon_list = [ ]
- skdiscovery.utilities.amazon_control.scheduler = None
- skdiscovery.utilities.amazon_control.popen = None

7.51 utilities/amazon_gui.py File Reference

Namespaces

- skdiscovery.utilities.amazon_gui

Functions

- def skdiscovery.utilities.amazon_gui.init ()
- def skdiscovery.utilities.amazon_gui.drawGUI ()
- def skdiscovery.utilities.amazon_gui.changeButtonState (enabled=True)
- def skdiscovery.utilities.amazon_gui.checkValidValues ()

Variables

- skdiscovery.utilities.amazon_gui.widget_dict = OrderedDict()
- list skdiscovery.utilities.amazon_gui.disable_list
- list skdiscovery.utilities.amazon_gui.key_value_list

7.52 utilities/astro_tools.py File Reference

Namespaces

- skdiscovery.utilities.astro_tools

Functions

- def skdiscovery.utilities.astro_tools.z_to_v (z)
- def skdiscovery.utilities.astro_tools.v_to_z (v)
- def skdiscovery.utilities.astro_tools.angular_separation (ra1, dec1, ra2, dec2)
- def skdiscovery.utilities.astro_tools.move_point (ra, dec, ang_dist, bearing)
- def skdiscovery.utilities.astro_tools.abs_mag (app_mag, z)
- def skdiscovery.utilities.astro_tools.app_mag (abs_mag, z)
- def skdiscovery.utilities.astro_tools.nfw (R, norm_constant, Rs, Rcore)
- def skdiscovery.utilities.astro_tools.lf (x, A, mstar, alpha)
- def skdiscovery.utilities.astro_tools.dlf (x, A, m1, a1, m2, a2)
- def skdiscovery.utilities.astro_tools.cdf_dlf (x, A, m1, a1, m2, a2, start=-26)
- def skdiscovery.utilities.astro_tools.inv_cdf_dlf (p, A, m1, a1, m2, a2, start=-26, end=-15)

7.53 utilities/config.py File Reference

Namespaces

- skdiscovery.utilities.config

Functions

- def skdiscovery.utilities.config.getConfig ()
- def skdiscovery.utilities.config.writeConfigValue (section, key, value)
- def skdiscovery.utilities.config.getDispyPassword ()
- def skdiscovery.utilities.config.getHostName ()

7.54 utilities/kalman_smoother.py File Reference

Namespaces

- skdiscovery.utilities.kalman_smoother

Functions

- def skdiscovery.utilities.kalman_smoother.KalmanFilter (in_data, t, sigma_sq, R, Pinit, x0=0, invert=False, clipping=5)
- def skdiscovery.utilities.kalman_smoother.FitFOGMParameters (data, Pinit=100, R=1, method='brute', x0=0, clipping=5)
- def skdiscovery.utilities.kalman_smoother.IterativeGridSearch (f, args, intervals, max_iter=50, tol=0.↩ 1, bounds=None, prev_minimum=None, verbose=False)
- def skdiscovery.utilities.kalman_smoother.KalmanSmoother (in_data, Pinit=1e6, Restimate=1, clipping=5, method='simple', t=None, sigma_sq=None, R=1, verbose=False, max_clip_iter=10)
- def skdiscovery.utilities.kalman_smoother.FOGM (size, t, sigma_sq, R)

7.55 utilities/pbo_tools.py File Reference

Namespaces

- skdiscovery.utilities.pbo_tools

Functions

- def skdiscovery.utilities.pbo_tools.mogi (xdata, lat, lon, source_depth, amplitude)
- def skdiscovery.utilities.pbo_tools.finite_sphere (xdata, lat, lon, source_depth, amplitude, alpha_rad)
- def skdiscovery.utilities.pbo_tools.closed_pipe (xdata, lat, lon, source_depth, amplitude, pipe_delta)
- def skdiscovery.utilities.pbo_tools.constant_open_pipe (xdata, lat, lon, source_depth, amplitude, pipe_delta)
- def skdiscovery.utilities.pbo_tools.rising_open_pipe (xdata, lat, lon, source_depth, amplitude, pipe_delta, open↩ _pipe_top)
- def skdiscovery.utilities.pbo_tools.sill (xdata, lat, lon, source_depth, amplitude)
- def skdiscovery.utilities.pbo_tools.dirEigenvectors (coord_list, pca_comps, pdir='H')
- def skdiscovery.utilities.pbo_tools.datetimeToNumber (in_time)

7.56 utilities/random_walks.py File Reference

Namespaces

- skdiscovery.utilities.random_walks

Functions

- def skdiscovery.utilities.random_walks.uniform_walk (pos, grid, step_size=None)
- def skdiscovery.utilities.random_walks.gaussian_walk (pos, grid, step_size=None)
- def skdiscovery.utilities.random_walks.keep_in_bound (pos, grid)

7.57 utilities/spherical_voronoi.py File Reference

Namespaces

- skdiscovery.utilities.spherical_voronoi

Functions

- def skdiscovery.utilities.spherical_voronoi.sphericalToXYZ (lat, lon, radius=1)
- def skdiscovery.utilities.spherical_voronoi.xyzToSpherical (x, y, z)
- def skdiscovery.utilities.spherical_voronoi.find_match (region_index, region_list)
- def skdiscovery.utilities.spherical_voronoi.getVoronoiCollection (data, lat_name, lon_name, bmap=None, v_↩ name=None, full_sphere=False, max_v=.3, min_v=-0.3, cmap=matplotlib.cm.get_cmap('jet'))

7.58 utilities/ssh_reverse.py File Reference

Classes

- class skdiscovery.utilities.ssh_reverse.ReverseTunnel

Namespaces

- skdiscovery.utilities.ssh_reverse

Functions

- def skdiscovery.utilities.ssh_reverse.print_verbose (s, verbose=False)
- def skdiscovery.utilities.ssh_reverse.handler (chan, host, port, verbose=False)
- def skdiscovery.utilities.ssh_reverse.reverse_forward_tunnel (server_port, remote_host, remote_port, transport, check=30, verbose=False)

7.59 utilities/trendTools.py File Reference

Namespaces

- skdiscovery.utilities.trendTools

Functions

- def skdiscovery.utilities.trendTools.getTrend (xdata)
- def skdiscovery.utilities.trendTools.sinuFits (xdata, fitN=2, rmve=1)
- def skdiscovery.utilities.trendTools.interpNaN (data)
- def skdiscovery.utilities.trendTools.medianFilter (data, window, interpolate=True)

7.60 utilities/variantdbscan.py File Reference

Classes

- class skdiscovery.utilities.VariantDBScan

Namespaces

- skdiscovery.utilities.variantdbscan

7.61 visualization/multi_ca_plot.py File Reference

Namespaces

- skdiscovery.visualization.multi_ca_plot

Functions

- def skdiscovery.visualization.multiCaPlot (pipeline, mogiFlag=False, offset=.15, direction='H', pca_comp=0, scaleFactor=2.5, map_res='i')

7.62 visualization/multi_dist.py File Reference

Namespaces

- skdiscovery.visualization.multi_dist

Functions

- def skdiscovery.visualization.calc_distance_map (pipeline, ap_name, ca_name, ca_type, plotFlag=True, hist↩ Idx=False, fontsize=10)

Variables

- skdiscovery.visualization.font

Index