1.7.2 imageevaluator - Tool

Package synthesis
Module simulator

Tool for evaluating simulated images
include "imageevaluator.g"

Description

imageevaluator provides a set of simple tools for evaluating the quality of a simulated image. Some functions, such as dynamicrange, need no truth image and can be run on images made from real data. Other functions, such as fidelity, require a truth image and can be used to compare a reconstructed image to the model from which the data were simulated.

Example

The following example shows one way to use the imageevaluator tool:

```
include 'imageevaluator.g'
#
# construct an imageevaluator tool
#
ime := imageevaluator('TEST.IMAGE');
#
# make a region which contains off-source pixels
#
r := drm.box(blc="1 1 1", trc="30 30 1")
#
# calculate dynamic range
#
ime.dynamicrange(r);
#
#  calculate image fidelity, ignoring truth pixels below 0.01
#
truthmin := 0.01;
ime.fidelity('TRUTH.IMAGE', truthmin);
#
ime.done();
#
```

Constructors

imageevaluator	Construct an imageevaluator tool

Functions

done	Finishes up the imageevaluator tool
dynamicrange	Calculate image dynamic range
fidelity	Calculate the median image fidelity

imageevaluator - Constructor

Package	synthesis
Module	simulator
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Construct an imageevaluator tool

Synopsis
imageevaluator(myimage)

Description
This is used to construct an imageevaluator tool associated with an Image. The imageevaluator tool may then be used to calculate various measures of the image quality.
This returns a Glish variable containing the tool functions of imageevaluator.

Arguments

myimage	Image to be evaluated Allowed: Image name

Returns
imageevaluator tool

Example

```
ime:=imageevaluator('TEST.IMAGE')
```

---

imageevaluator.dynamicrange - Function

Package	synthesis
Module	simulator
Tool	imageevaluator

Calculate image dynamic range

Synopsis
dynamicrange(offregion)

Description
The image dynamic range is defined as the peak of the image divided by the rms of the off-source region.

Arguments

offregion	A region containing off-source pixels Allowed Region Default unset

Returns
Bool

Example

```
ime.dynamicrange(r);
```

---

imageevaluator.fidelity - Function

Package	synthesis
Module	simulator
Tool	imageevaluator

Calculate the median image fidelity

Synopsis

```
fidelity(model, modmin, mode, moment)
```

Description
The median image fidelity is defined as the median of the fidelity image, defined as

$$fidelity = model * beam/abs(model * beam - image). \qquad (1.34)$$

To avoid being biased by very weak emission, there is a minimum clip in the model pixel brightness.
The moment fidelity is defined as the average of the fidelity image multiplied by the model * beam image, clipped to avoid the low brightness pixels.
Currently, the model image must be the same size as the image to calculate the fidelity.

Arguments

model	Model or truth image Allowed:Image Default:''
modmin	Minimum pixel value in the model image to be used Allowed:Float Default:0.001
mode	Mode of fidelity calculation Allowed:'median'|'moment' Default:'median'
moment	Exponent of model image to use for moment fidelity Allowed:Float Default:1.0

Returns
Bool

Example

```
ime.fidelity(model='TRUTH.IMAGE', modmin=0.01, mode='median');
```

---

imageevaluator.done - Function