

CaseCreation

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Chapter 1

Hierarchical Index

1.1 Class Hierarchy

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

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Chapter 2

Class Index

2.1 Class List

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

cascreator.caseinfo	Class with static information about the case	5
cascreator.ControlPoint	The next class defines a control point; in particular, the location of all beamlets, notice that angle or zero is located in the part above, and the gantry moves counterclockwise	6
cascreator.OAR	7
cascreator.TARGET	8
cascreator.VOI	Abstract class that implements a volume of interest with common location and radius	9
cascreator.voxel	This class defines not only the x,y position of a voxel, but also assigns to it a unique ID and maps a structure to it	10
cascreator.voxelbeamletpair	Class that uses a data pair and implements some geographical operations	11

Chapter 3

Class Documentation

3.1 casecreator.caseinfo Class Reference

Class with static information about the case.

Public Member Functions

- def `__init__`
Constructor.

Public Attributes

- **isoX**
- **isoY**
- **R**

Static Public Attributes

- float `isoX` = 0.0
Center of the body (which also will contain a tumour) Coord.
- float `isoY` = 0.0
Center of the body (which also will contain a tumour) Coord.
- float `R` = 20.0
Default radius of the body.
- int `N` = 64
Number of beamlets in the fan.
- float `interleaf` = 0.6
Interbeamlet distance in the fan.
- int `SAD` = 80
Source to axis distance calibration in cms.
- `genFan2D` = None
Original fan with N positions (64)

3.1.1 Detailed Description

Class with static information about the case.

3.1.2 Member Data Documentation

3.1.2.1 `float casecreator.caseinfo.interleaf = 0.6` [static]

Interbeamlet distance in the fan.

Which amounts to 6mms.

3.1.2.2 `float casecreator.caseinfo.isoX = 0.0` [static]

Center of the body (which also will contain a tumour) Coord.

X

3.1.2.3 `float casecreator.caseinfo.isoY = 0.0` [static]

Center of the body (which also will contain a tumour) Coord.

X

3.1.2.4 `float casecreator.caseinfo.R = 20.0` [static]

Default radius of the body.

Will be overridden

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

- C:/Users/S170452/PycharmProjects/CaseCreation/casecreator.py

3.2 casecreator.ControlPoint Class Reference

The next class defines a control point; in particular, the location of all beamlets, notice that angle or zero is located in the part above, and the gantry moves counterclockwise.

Public Member Functions

- `def __init__ (self, ctrlAngle, thiscase)`
Constructor Function.
- `def findNDist (self, x, y)`
Find normal distances to each of the beamlet array centers.

Public Attributes

- `tc`
Global data structure of the case.
- `angleDeps`
This control point angle in degrees.
- `angleRads`
This control point angle in radians.
- `thisFan`
This fan beam.
- `UnitVector`

Find the unit vector that points towards the isocenter.

- [normaltoUnit](#)

Find the unit vector that is perpendicular to the original unit vector.

3.2.1 Detailed Description

The next class defines a control point; in particular, the location of all beamlets, notice that angle or zero is located in the part above, and the gantry moves counterclockwise.

3.2.2 Member Function Documentation

3.2.2.1 `def casecreator.ControlPoint.findNDist (self, x, y)`

Find normal distances to each of the beamlet array centers.

This function returns an array of distances from which I will choose those that are small enough to correspond to beams that affect the radiation to the supplied voxel.

3.2.3 Member Data Documentation

3.2.3.1 `casecreator.ControlPoint.thisFan`

This fan beam.

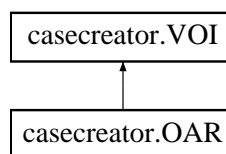
Notice that it gets rotated the number of radians necessary

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

- C:/Users/S170452/PycharmProjects/CaseCreation/casecreator.py

3.3 casecreator.OAR Class Reference

Inheritance diagram for casecreator.OAR:



Public Member Functions

- `def __init__`
Constructor function that also calls the constructor of [VOI](#).
- `def printVOI (self)`
Print the characteristics of this structure on screen.

Public Attributes

- [isTarget](#)
Boolean.
- [OARID](#)
Assign an ID to each of the different OARs.

Static Public Attributes

- int **numOARS** = 0

3.3.1 Constructor & Destructor Documentation

3.3.1.1 `def casecreator.OAR.__init__(self, thiscase, x = 0.0, y = 0.0, r = 0.0)`

Constructor function that also calls the constructor of [VOI](#).

Notice that a [VOI](#) object is instantiated first, and then an [OAR](#) object is instantiated later

3.3.2 Member Data Documentation

3.3.2.1 `casecreator.OAR.isTarget`

Boolean.

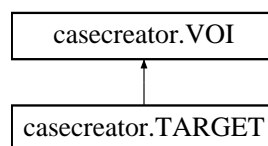
Is this a target structure?

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

- C:/Users/S170452/PycharmProjects/CaseCreation/casecreator.py

3.4 casecreator.TARGET Class Reference

Inheritance diagram for casecreator.TARGET:



Public Member Functions

- `def __init__`
Constructor function that also calls the constructor of [VOI](#).
- `def printVOI (self)`
Print the characteristics of this structure on screen.

Public Attributes

- [isTarget](#)
Boolean.
- [TARGETID](#)
Assign an ID to each of the different targets.

Static Public Attributes

- int **numTARGETS** = 0

3.4.1 Constructor & Destructor Documentation

3.4.1.1 `def casecreator.TARGET.__init__(self, thiscase, x=0.0, y=0.0, r=0.0)`

Constructor function that also calls the constructor of [VOI](#).

Notice that a [VOI](#) object is instantiated first, and then a [TARGET](#) object is instantiated later

3.4.2 Member Data Documentation

3.4.2.1 `casecreator.TARGET.isTarget`

Boolean.

Is this a target structure?

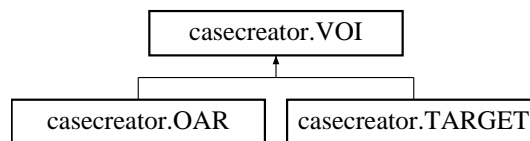
The documentation for this class was generated from the following file:

- C:/Users/S170452/PycharmProjects/CaseCreation/casecreator.py

3.5 casecreator.VOI Class Reference

Abstract class that implements a volume of interest with common location and radius.

Inheritance diagram for casecreator.VOI:



Public Member Functions

- `def __init__`
Constructor function.
- `def isContained (self)`
This method finds whether the attribute is viable, given its center and radius and given the center and radius of the original body that contains it.
- `def isInThisVOI (self, x, y)`
This method takes a location in space and returns whether this location exists in this [VOI](#) or not.
- `def printVOI (self)`

Public Attributes

- [tc](#)
Object with general information about the case.
- [xcenter](#)
X location of center.
- [ycenter](#)
Y location of center.
- [radius](#)
Radius of the Volume of Interest.

- [isTarget](#)

Boolean that determines whether this is a target or not (in case of False, it is an [OAR](#))

- [isinside](#)

Is this region contained inside the body?

- [VOID](#)

Unique ID for each particular Volume of Interest.

Static Public Attributes

- `int numVOIs = 0`

Static counter of Volumes of Interest.

3.5.1 Detailed Description

Abstract class that implements a volume of interest with common location and radius.

Parent of [OAR](#) and [TARGET](#)

3.5.2 Member Data Documentation

3.5.2.1 `casecreator.VOI.radius`

Radius of the Volume of Interest.

All of them are circumferences

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

- `C:/Users/S170452/PycharmProjects/CaseCreation/casecreator.py`

3.6 `casecreator.voxel` Class Reference

This class defines not only the x,y position of a voxel, but also assigns to it a unique ID and maps a structure to it.

Public Member Functions

- `def __init__(self, vc, OARS, TARGETS)`

Public Attributes

- [voxelID](#)

Indicates a unique ID for each of the voxels.

- [x](#)

x location of voxel center

- [y](#)

y location of voxel center

- [belongsToVOI](#)

Does this voxel belong to ANY [VOI](#)?

- [inStructureID](#)

ID of the [VOI](#) to which this voxel belongs to.

Static Public Attributes

- int `numVOXELS` = 0

Static variable that serves as a counter of how many voxels are actively being used at any time.

3.6.1 Detailed Description

This class defines not only the x,y position of a voxel, but also assigns to it a unique ID and maps a structure to it.

3.6.2 Member Data Documentation

3.6.2.1 casecreator.voxel.belongsToVOI

Does this voxel belong to ANY `VOI`?

Run this code for all OARs and TARGETs, preference to targets.

3.6.2.2 casecreator.voxel.inStructureID

ID of the `VOI` to which this voxel belongs to.

There is a hierarchy that depends on the order of the VOIS with targets taking precedence over OARs.

3.6.2.3 int casecreator.voxel.numVOXELS = 0 [static]

Static variable that serves as a counter of how many voxels are actively being used at any time.

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

- C:/Users/S170452/PycharmProjects/CaseCreation/casecreator.py

3.7 casecreator.voxelbeamletpair Class Reference

Class that uses a data pair and implements some geographical operations.

Public Member Functions

- def `__init__` (self, v)
Constructor Function.
- def `distToBeamC` (self, xBeamC, yBeamC)
This function calculates the distance from my geographical location to the center of a beamlet.
- def `distToIsoC` (self, thiscase)
Function to calculate distance from this point to isocenter (not used)
- def `isinterior` (self, xinterp, xBeamC)
This function finds whether a point lies INSIDE the line SEGMENT between the beamlet and the voxel or not.
- def `depthBeamC` (self, xBeamC, yBeamC, R)
Find the depth of this voxel inside the body.

Public Attributes

- `x`
Voxel center x coordinate.
- `y`
Voxel Center y coordinate.
- `depth`
Variable containing the depth of the voxel in the direction from the beamlet or how much the beam travels.

3.7.1 Detailed Description

Class that uses a data pair and implements some geographical operations.

Depth of the voxel given beam.

3.7.2 Member Function Documentation

3.7.2.1 `def casecreator.voxelbeamletpair.depthBeamC (self, xBeamC, yBeamC, R)`

Find the depth of this voxel inside the body.

The depth will be the only factor used in order to calculate accumulated dose.

3.7.2.2 `def casecreator.voxelbeamletpair.isinterior (self, xinterp, xBeamC)`

This function finds whether a point lies INSIDE the line SEGMENT between the beamlet and the voxel or not.

3.7.3 Member Data Documentation

3.7.3.1 `casecreator.voxelbeamletpair.depth`

Variable containing the depth of the voxel in the direction from the beamlet or how much the beam travels.

To understand the methodology look at <http://mathworld.wolfram.com/Circle-LineIntersection.html> First I initialize some variables.

Use the point of intersection of line and circle to calculate the depth of the voxel

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

- `C:/Users/S170452/PycharmProjects/CaseCreation/casecreator.py`

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