Fotorealistyczna Grafika Komputerowa

Matematyka wektorów

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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:

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Chapter 3

Class Documentation

3.1 plane.Plane Class Reference

Documentation for a class Plane.

Public Member Functions

- def __init__ (self, normal_vector, d)

  The constructor.
- def __str__ (self)

  Function printing plane attributes.
- def get_intersection (self, ray)

  Function returning intersection of a ray and a plane.

Public Attributes

- normal_vector

  A class variable.
- a

  A class variable.
- b

  A class variable.
- c

  A class variable.
- d

  A class variable.

3.1.1 Detailed Description

Documentation for a class Plane.

3.1.2 Member Function Documentation

3.1.2.1 get_intersection()

```
def plane.Plane.get_intersection (
              self,
              ray )
```

Function returning intersection of a ray and a plane.

3.1.3 Member Data Documentation

3.1.3.1 a

```
plane.Plane.a
```

A class variable.

Coordinate x of the normal vector.

3.1.3.2 b

```
plane.Plane.b
```

A class variable.

Coordinate y of the normal vector.

3.1.3.3 c

```
plane.Plane.c
```

A class variable.

Coordinate z of the normal vector.

3.1.3.4 d

```
plane.Plane.d
```

A class variable.

A shift, along the plane normal, from the center of the coordinate system.

3.1.3.5 normal_vector

`plane.Plane.normal_vector`

A class variable.

Normal vector.

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

- plane.py

3.2 ray.Ray Class Reference

Documentation for a class Ray.

Public Member Functions

- def __init__ (self, origin=Vec3(0, 0, 0), direction=Vec3(1, 1, 1), length=math.inf)
  The constructor.
- def __str__ (self)
  Function printing ray attributes.
- def is_point_on_ray (self, point)
  Function returning true if point is on ray and false otherwise.
- def set_direction (self, new_direction)
  Function setting new direction vector.
- def get_plane_intersection (self, plane)
  Function calling plane.get_intersection() method.
- def get_sphere_intersections (self, sphere)
  Function calling sphere.get_ray_intersections() method.

Public Attributes

- origin
  A class variable.
- direction
  A class variable.
- length
  A class variable.

3.2.1 Detailed Description

Documentation for a class Ray.

3.2.2 Member Data Documentation

3.2.2.1 direction

`ray.Ray.direction`

A class variable.

Direction vector of a given ray.

3.2.2.2 length

`ray.Ray.length`

A class variable.

Length of a given ray.

3.2.2.3 origin

`ray.Ray.origin`

A class variable.

Origin vector of a given ray.

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

- ray.py

3.3 sphere.Sphere Class Reference

Documentation for a class Sphere.

Public Member Functions

- def __init__ (self, centre=Vec3(0, 0, 0), radius=math.inf)
  The constructor.
- def get_centre (self)
  Function returning centre of the sphere.
- def get_radius (self)
  Function returning radius of the sphere.
- def surface_area (self)
  Function returning area of the sphere.
- def get_volume (self)
  Function returning volume of the sphere.
- def __str__ (self)
  Function printing sphere attributes.
- def get_ray_intersections (self, ray)
  Function returning intersection of a ray and a sphere.

Public Attributes

- centre
  A class variable.
- radius
  A class variable.
- area
  A class variable.
- volume
  A class variable.

3.3.1 Detailed Description

Documentation for a class Sphere.

3.3.2 Member Function Documentation

3.3.2.1 get_radius()

```
def sphere.Sphere.get_radius (
              self )
```

Function returning radius of the sphere.

3.3.2.2 get_ray_intersections()

```
def sphere.Sphere.get_ray_intersections (
              self,
              ray )
```

Function returning intersection of a ray and a sphere.

3.3.2.3 get_volume()

```
def sphere.Sphere.get_volume (
              self )
```

Function returning volume of the sphere.

3.3.2.4 surface_area()

```
def sphere.Sphere.surface_area (
              self )
```

Function returning area of the sphere.

3.3.3 Member Data Documentation

3.3.3.1 area

```
sphere.Sphere.area
```

A class variable.

Area of a sphere.

3.3.3.2 centre

```
sphere.Sphere.centre
```

A class variable.

Centre of a sphere.

3.3.3.3 radius

```
sphere.Sphere.radius
```

A class variable.

Radius of a sphere.

3.3.3.4 volume

```
sphere.Sphere.volume
```

A class variable.

Volume of a sphere.

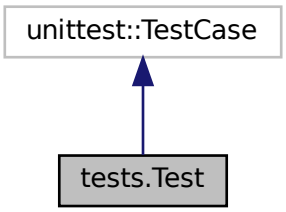
The documentation for this class was generated from the following file:

- sphere.py

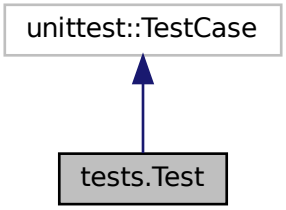
3.4 tests.Test Class Reference

Documentation for a class Test.

Inheritance diagram for tests.Test:



Collaboration diagram for tests.Test:



Public Member Functions

- def **setUp** (self)
- def test_add (self)

  Vector tests.
- def test_sub (self)

  Vector tests.
- def test_pos (self)

  Vector tests.
- def test_neg (self)

  Vector tests.
- def test_length (self)

  Vector tests.
- def test___truediv__ (self)

  Vector tests.

- def test_mul (self)

  Vector tests.
- def test_cross (self)

  Vector tests.
- def test_point_on_line (self)

  Ray tests.
- def test_plane_intersection (self)

  Plane tests.
- def test_get_centre (self)

  Sphere tests.
- def test_get_radius (self)

  Sphere tests.
- def test_surface_area (self)

  Sphere tests.
- def test_get_volume (self)

  Sphere tests.
- def test_get_sphere_intersection (self)

  Sphere tests.

Public Attributes

- **v1**
- **v2**
- **v3**
- **v4**
- **v5**
- **v6**
- **v7**
- **r1**
- **r2**
- **r3**
- **r4**
- **p1**
- **p2**
- **s1**
- **s2**

3.4.1 Detailed Description

Documentation for a class Test.

Unit tests.

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

- tests.py

3.5 vector.Vec2 Class Reference

Documentation for a class Vec2.

Public Member Functions

- def __init__ (self, x, y)

  The constructor.
- def __add__ (self, other)

  Function returning sum of two vectors or sum of a vector and a scalar.
- def __iadd__ (self, other)

  Function returning sum (In-place addition) of two vectors or sum of a vector and a scalar.
- def __sub__ (self, other)

  Function returning difference of two vectors or difference of a vector and a scalar.
- def __isub__ (self, other)

  Function returning difference (In-place Subtraction) of two vectors or difference of a vector and a scalar.
- def __eq__ (self, other)

  Function "equal".
- def __abs__ (self)

  Function returning absolute value of a given vector.
- def __ne__ (self, other)

  Function "not equal".
- def __neg__ (self)

  Function negating vector coordinates.
- def __pos__ (self)

  Function for positive vector coordinates.
- def __str__ (self)

  Function printing Vec2 attributes.
- def length (self)

  Function returning vector length.
- def distance (self, other)

  Function returning the length of the displacement vector (distance between two points).
- def __truediv__ (self, other)

  Function returning quotient of two vectors or quotient of a vector and a scalar.
- def __itruediv__ (self, other)

  Function returning quotient (In-place Division) of two vectors or quotient of a vector and a scalar.
- def __mul__ (self, other)

  Function returning dot product of two vectors or dot product of a vector and a scalar.
- def __imul__ (self, other)

  Function returning dot product (In-place multiplication) of two vectors or dot product of a vector and a scalar.
- def __rmul__ (self, other)

  Function returning cross product of two vectors.

Public Attributes

- x

  A class variable.
- y

  A class variable.

3.5.1 Detailed Description

Documentation for a class Vec2.

3.5.2 Member Data Documentation

3.5.2.1 x

`vector.Vec2.x`

A class variable.

Coordinate x of a given vector.

3.5.2.2 y

`vector.Vec2.y`

A class variable.

Coordinate y of a given vector.

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

- vector.py

3.6 vector.Vec3 Class Reference

Documentation for a class Vec3.

Public Member Functions

- def __init__ (self, x, y, z)
  The constructor.
- def __add__ (self, other)
  Function returning sum of two vectors or sum of a vector and a scalar.
- def __iadd__ (self, other)
  Function returning sum (In-place addition) of two vectors or sum of a vector and a scalar.
- def __sub__ (self, other)
  Function returning difference of two vectors or difference of a vector and a scalar.
- def __isub__ (self, other)
  Function returning difference (In-place Subtraction) of two vectors or difference of a vector and a scalar.
- def __eq__ (self, other)
  Function "equal".
- def __abs__ (self)
  Function returning absolute value of a given vector.
- def __ne__ (self, other)
  Function "not equal".
- def __neg__ (self)

Function negating vector coordinates.

- def __pos__ (self)

  Function for positive vector coordinates.

- def __str__ (self)

  Function printing Vec3 attributes.

- def length (self)

  Function returning vector length.

- def distance (self, other)

  Function returning the length of the displacement vector (distance between two points).

- def is_point_on_ray (self, ray)

  Is point on ray wrapper.

- def __truediv__ (self, other)

  Function returning quotient of two vectors or quotient of a vector and a scalar.

- def __itruediv__ (self, other)

  Function returning quotient (In-place Division) of two vectors or quotient of a vector and a scalar.

- def __mul__ (self, other)

  Function returning dot product of two vectors or dot product of a vector and a scalar.

- def __imul__ (self, other)

  Function returning dot product (In-place multiplication) of two vectors or dot product of a vector and a scalar.

- def __rmul__ (self, other)

  Function returning dot product (Reverse multiplication).

- def cross (self, other)

  Function returning cross product of two vectors.

Public Attributes

- x

  A class variable.

- y

  A class variable.

- z

  A class variable.

3.6.1 Detailed Description

Documentation for a class Vec3.

3.6.2 Member Data Documentation

3.6.2.1 x

`vector.Vec3.x`

A class variable.

Coordinate x of a given vector.

3.6.2.2 y

`vector.Vec3.y`

A class variable.

Coordinate y of a given vector.

3.6.2.3 z

`vector.Vec3.z`

A class variable.

Coordinate z of a given vector.

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

- vector.py

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