| | [**Overview**](http://docs.google.com/overview-summary.html) | [**Package**](http://docs.google.com/package-summary.html) | **Class** | [**Use**](http://docs.google.com/class-use/QuadCurve2D.html) | [**Tree**](http://docs.google.com/package-tree.html) | [**Deprecated**](http://docs.google.com/deprecated-list.html) | [**Index**](http://docs.google.com/index-files/index-1.html) | [**Help**](http://docs.google.com/help-doc.html) | | --- | --- | --- | --- | --- | --- | --- | --- | | | ***Java™ Platform***  ***Standard Ed. 6*** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| [**PREV CLASS**](http://docs.google.com/java/awt/geom/Point2D.Float.html)   [**NEXT CLASS**](http://docs.google.com/java/awt/geom/QuadCurve2D.Double.html) | [**FRAMES**](http://docs.google.com/index.html?java/awt/geom/QuadCurve2D.html)    [**NO FRAMES**](http://docs.google.com/QuadCurve2D.html)     [**All Classes**](http://docs.google.com/allclasses-noframe.html) |
| SUMMARY: [NESTED](#3znysh7) | FIELD | [CONSTR](#2et92p0) | [METHOD](#tyjcwt) | DETAIL: FIELD | [CONSTR](#4d34og8) | [METHOD](#17dp8vu) |

## **java.awt.geom**

Class QuadCurve2D

[java.lang.Object](http://docs.google.com/java/lang/Object.html)  
 **java.awt.geom.QuadCurve2D**

**All Implemented Interfaces:** [Shape](http://docs.google.com/java/awt/Shape.html), [Cloneable](http://docs.google.com/java/lang/Cloneable.html) **Direct Known Subclasses:** [QuadCurve2D.Double](http://docs.google.com/java/awt/geom/QuadCurve2D.Double.html), [QuadCurve2D.Float](http://docs.google.com/java/awt/geom/QuadCurve2D.Float.html)

public abstract class **QuadCurve2D**extends [Object](http://docs.google.com/java/lang/Object.html)implements [Shape](http://docs.google.com/java/awt/Shape.html), [Cloneable](http://docs.google.com/java/lang/Cloneable.html)

The QuadCurve2D class defines a quadratic parametric curve segment in (x,y) coordinate space.

This class is only the abstract superclass for all objects that store a 2D quadratic curve segment. The actual storage representation of the coordinates is left to the subclass.

**Since:** 1.2

| **Nested Class Summary** | |
| --- | --- |
| static class | [**QuadCurve2D.Double**](http://docs.google.com/java/awt/geom/QuadCurve2D.Double.html)            A quadratic parametric curve segment specified with double coordinates. |
| static class | [**QuadCurve2D.Float**](http://docs.google.com/java/awt/geom/QuadCurve2D.Float.html)            A quadratic parametric curve segment specified with float coordinates. |

| **Constructor Summary** | |
| --- | --- |
| protected | [**QuadCurve2D**](http://docs.google.com/java/awt/geom/QuadCurve2D.html#QuadCurve2D())()            This is an abstract class that cannot be instantiated directly. |

| **Method Summary** | |
| --- | --- |
| [Object](http://docs.google.com/java/lang/Object.html) | [**clone**](http://docs.google.com/java/awt/geom/QuadCurve2D.html#clone())()            Creates a new object of the same class and with the same contents as this object. |
| boolean | [**contains**](http://docs.google.com/java/awt/geom/QuadCurve2D.html#contains(double,%20double))(double x, double y)            Tests if the specified coordinates are inside the boundary of the Shape. |
| boolean | [**contains**](http://docs.google.com/java/awt/geom/QuadCurve2D.html#contains(double,%20double,%20double,%20double))(double x, double y, double w, double h)            Tests if the interior of the Shape entirely contains the specified rectangular area. |
| boolean | [**contains**](http://docs.google.com/java/awt/geom/QuadCurve2D.html#contains(java.awt.geom.Point2D))([Point2D](http://docs.google.com/java/awt/geom/Point2D.html) p)            Tests if a specified [Point2D](http://docs.google.com/java/awt/geom/Point2D.html) is inside the boundary of the Shape. |
| boolean | [**contains**](http://docs.google.com/java/awt/geom/QuadCurve2D.html#contains(java.awt.geom.Rectangle2D))([Rectangle2D](http://docs.google.com/java/awt/geom/Rectangle2D.html) r)            Tests if the interior of the Shape entirely contains the specified Rectangle2D. |
| [Rectangle](http://docs.google.com/java/awt/Rectangle.html) | [**getBounds**](http://docs.google.com/java/awt/geom/QuadCurve2D.html#getBounds())()            Returns an integer [Rectangle](http://docs.google.com/java/awt/Rectangle.html) that completely encloses the Shape. |
| abstract  [Point2D](http://docs.google.com/java/awt/geom/Point2D.html) | [**getCtrlPt**](http://docs.google.com/java/awt/geom/QuadCurve2D.html#getCtrlPt())()            Returns the control point. |
| abstract  double | [**getCtrlX**](http://docs.google.com/java/awt/geom/QuadCurve2D.html#getCtrlX())()            Returns the X coordinate of the control point in double precision. |
| abstract  double | [**getCtrlY**](http://docs.google.com/java/awt/geom/QuadCurve2D.html#getCtrlY())()            Returns the Y coordinate of the control point in double precision. |
| double | [**getFlatness**](http://docs.google.com/java/awt/geom/QuadCurve2D.html#getFlatness())()            Returns the flatness, or maximum distance of a control point from the line connecting the end points, of this QuadCurve2D. |
| static double | [**getFlatness**](http://docs.google.com/java/awt/geom/QuadCurve2D.html#getFlatness(double%5B%5D,%20int))(double[] coords, int offset)            Returns the flatness, or maximum distance of a control point from the line connecting the end points, of the quadratic curve specified by the control points stored in the indicated array at the indicated index. |
| static double | [**getFlatness**](http://docs.google.com/java/awt/geom/QuadCurve2D.html#getFlatness(double,%20double,%20double,%20double,%20double,%20double))(double x1, double y1, double ctrlx, double ctrly, double x2, double y2)            Returns the flatness, or maximum distance of a control point from the line connecting the end points, of the quadratic curve specified by the indicated control points. |
| double | [**getFlatnessSq**](http://docs.google.com/java/awt/geom/QuadCurve2D.html#getFlatnessSq())()            Returns the square of the flatness, or maximum distance of a control point from the line connecting the end points, of this QuadCurve2D. |
| static double | [**getFlatnessSq**](http://docs.google.com/java/awt/geom/QuadCurve2D.html#getFlatnessSq(double%5B%5D,%20int))(double[] coords, int offset)            Returns the square of the flatness, or maximum distance of a control point from the line connecting the end points, of the quadratic curve specified by the control points stored in the indicated array at the indicated index. |
| static double | [**getFlatnessSq**](http://docs.google.com/java/awt/geom/QuadCurve2D.html#getFlatnessSq(double,%20double,%20double,%20double,%20double,%20double))(double x1, double y1, double ctrlx, double ctrly, double x2, double y2)            Returns the square of the flatness, or maximum distance of a control point from the line connecting the end points, of the quadratic curve specified by the indicated control points. |
| abstract  [Point2D](http://docs.google.com/java/awt/geom/Point2D.html) | [**getP1**](http://docs.google.com/java/awt/geom/QuadCurve2D.html#getP1())()            Returns the start point. |
| abstract  [Point2D](http://docs.google.com/java/awt/geom/Point2D.html) | [**getP2**](http://docs.google.com/java/awt/geom/QuadCurve2D.html#getP2())()            Returns the end point. |
| [PathIterator](http://docs.google.com/java/awt/geom/PathIterator.html) | [**getPathIterator**](http://docs.google.com/java/awt/geom/QuadCurve2D.html#getPathIterator(java.awt.geom.AffineTransform))([AffineTransform](http://docs.google.com/java/awt/geom/AffineTransform.html) at)            Returns an iteration object that defines the boundary of the shape of this QuadCurve2D. |
| [PathIterator](http://docs.google.com/java/awt/geom/PathIterator.html) | [**getPathIterator**](http://docs.google.com/java/awt/geom/QuadCurve2D.html#getPathIterator(java.awt.geom.AffineTransform,%20double))([AffineTransform](http://docs.google.com/java/awt/geom/AffineTransform.html) at, double flatness)            Returns an iteration object that defines the boundary of the flattened shape of this QuadCurve2D. |
| abstract  double | [**getX1**](http://docs.google.com/java/awt/geom/QuadCurve2D.html#getX1())()            Returns the X coordinate of the start point in double in precision. |
| abstract  double | [**getX2**](http://docs.google.com/java/awt/geom/QuadCurve2D.html#getX2())()            Returns the X coordinate of the end point in double precision. |
| abstract  double | [**getY1**](http://docs.google.com/java/awt/geom/QuadCurve2D.html#getY1())()            Returns the Y coordinate of the start point in double precision. |
| abstract  double | [**getY2**](http://docs.google.com/java/awt/geom/QuadCurve2D.html#getY2())()            Returns the Y coordinate of the end point in double precision. |
| boolean | [**intersects**](http://docs.google.com/java/awt/geom/QuadCurve2D.html#intersects(double,%20double,%20double,%20double))(double x, double y, double w, double h)            Tests if the interior of the Shape intersects the interior of a specified rectangular area. |
| boolean | [**intersects**](http://docs.google.com/java/awt/geom/QuadCurve2D.html#intersects(java.awt.geom.Rectangle2D))([Rectangle2D](http://docs.google.com/java/awt/geom/Rectangle2D.html) r)            Tests if the interior of the Shape intersects the interior of a specified Rectangle2D. |
| void | [**setCurve**](http://docs.google.com/java/awt/geom/QuadCurve2D.html#setCurve(double%5B%5D,%20int))(double[] coords, int offset)            Sets the location of the end points and control points of this QuadCurve2D to the double coordinates at the specified offset in the specified array. |
| abstract  void | [**setCurve**](http://docs.google.com/java/awt/geom/QuadCurve2D.html#setCurve(double,%20double,%20double,%20double,%20double,%20double))(double x1, double y1, double ctrlx, double ctrly, double x2, double y2)            Sets the location of the end points and control point of this curve to the specified double coordinates. |
| void | [**setCurve**](http://docs.google.com/java/awt/geom/QuadCurve2D.html#setCurve(java.awt.geom.Point2D%5B%5D,%20int))([Point2D](http://docs.google.com/java/awt/geom/Point2D.html)[] pts, int offset)            Sets the location of the end points and control points of this QuadCurve2D to the coordinates of the Point2D objects at the specified offset in the specified array. |
| void | [**setCurve**](http://docs.google.com/java/awt/geom/QuadCurve2D.html#setCurve(java.awt.geom.Point2D,%20java.awt.geom.Point2D,%20java.awt.geom.Point2D))([Point2D](http://docs.google.com/java/awt/geom/Point2D.html) p1, [Point2D](http://docs.google.com/java/awt/geom/Point2D.html) cp, [Point2D](http://docs.google.com/java/awt/geom/Point2D.html) p2)            Sets the location of the end points and control point of this QuadCurve2D to the specified Point2D coordinates. |
| void | [**setCurve**](http://docs.google.com/java/awt/geom/QuadCurve2D.html#setCurve(java.awt.geom.QuadCurve2D))([QuadCurve2D](http://docs.google.com/java/awt/geom/QuadCurve2D.html) c)            Sets the location of the end points and control point of this QuadCurve2D to the same as those in the specified QuadCurve2D. |
| static int | [**solveQuadratic**](http://docs.google.com/java/awt/geom/QuadCurve2D.html#solveQuadratic(double%5B%5D))(double[] eqn)            Solves the quadratic whose coefficients are in the eqn array and places the non-complex roots back into the same array, returning the number of roots. |
| static int | [**solveQuadratic**](http://docs.google.com/java/awt/geom/QuadCurve2D.html#solveQuadratic(double%5B%5D,%20double%5B%5D))(double[] eqn, double[] res)            Solves the quadratic whose coefficients are in the eqn array and places the non-complex roots into the res array, returning the number of roots. |
| static void | [**subdivide**](http://docs.google.com/java/awt/geom/QuadCurve2D.html#subdivide(double%5B%5D,%20int,%20double%5B%5D,%20int,%20double%5B%5D,%20int))(double[] src, int srcoff, double[] left, int leftoff, double[] right, int rightoff)            Subdivides the quadratic curve specified by the coordinates stored in the src array at indices srcoff through srcoff + 5 and stores the resulting two subdivided curves into the two result arrays at the corresponding indices. |
| void | [**subdivide**](http://docs.google.com/java/awt/geom/QuadCurve2D.html#subdivide(java.awt.geom.QuadCurve2D,%20java.awt.geom.QuadCurve2D))([QuadCurve2D](http://docs.google.com/java/awt/geom/QuadCurve2D.html) left, [QuadCurve2D](http://docs.google.com/java/awt/geom/QuadCurve2D.html) right)            Subdivides this QuadCurve2D and stores the resulting two subdivided curves into the left and right curve parameters. |
| static void | [**subdivide**](http://docs.google.com/java/awt/geom/QuadCurve2D.html#subdivide(java.awt.geom.QuadCurve2D,%20java.awt.geom.QuadCurve2D,%20java.awt.geom.QuadCurve2D))([QuadCurve2D](http://docs.google.com/java/awt/geom/QuadCurve2D.html) src, [QuadCurve2D](http://docs.google.com/java/awt/geom/QuadCurve2D.html) left, [QuadCurve2D](http://docs.google.com/java/awt/geom/QuadCurve2D.html) right)            Subdivides the quadratic curve specified by the src parameter and stores the resulting two subdivided curves into the left and right curve parameters. |

| **Methods inherited from class java.lang.**[**Object**](http://docs.google.com/java/lang/Object.html) |
| --- |
| [equals](http://docs.google.com/java/lang/Object.html#equals(java.lang.Object)), [finalize](http://docs.google.com/java/lang/Object.html#finalize()), [getClass](http://docs.google.com/java/lang/Object.html#getClass()), [hashCode](http://docs.google.com/java/lang/Object.html#hashCode()), [notify](http://docs.google.com/java/lang/Object.html#notify()), [notifyAll](http://docs.google.com/java/lang/Object.html#notifyAll()), [toString](http://docs.google.com/java/lang/Object.html#toString()), [wait](http://docs.google.com/java/lang/Object.html#wait()), [wait](http://docs.google.com/java/lang/Object.html#wait(long)), [wait](http://docs.google.com/java/lang/Object.html#wait(long,%20int)) |

| **Methods inherited from interface java.awt.**[**Shape**](http://docs.google.com/java/awt/Shape.html) |
| --- |
| [getBounds2D](http://docs.google.com/java/awt/Shape.html#getBounds2D()) |

| **Constructor Detail** |
| --- |

### QuadCurve2D

protected **QuadCurve2D**()

This is an abstract class that cannot be instantiated directly. Type-specific implementation subclasses are available for instantiation and provide a number of formats for storing the information necessary to satisfy the various accessor methods below.

**Since:** 1.2 **See Also:**[QuadCurve2D.Float](http://docs.google.com/java/awt/geom/QuadCurve2D.Float.html), [QuadCurve2D.Double](http://docs.google.com/java/awt/geom/QuadCurve2D.Double.html)

| **Method Detail** |
| --- |

### getX1

public abstract double **getX1**()

Returns the X coordinate of the start point in double in precision.

**Returns:**the X coordinate of the start point.**Since:** 1.2

### getY1

public abstract double **getY1**()

Returns the Y coordinate of the start point in double precision.

**Returns:**the Y coordinate of the start point.**Since:** 1.2

### getP1

public abstract [Point2D](http://docs.google.com/java/awt/geom/Point2D.html) **getP1**()

Returns the start point.

**Returns:**a Point2D that is the start point of this QuadCurve2D.**Since:** 1.2

### getCtrlX

public abstract double **getCtrlX**()

Returns the X coordinate of the control point in double precision.

**Returns:**X coordinate the control point**Since:** 1.2

### getCtrlY

public abstract double **getCtrlY**()

Returns the Y coordinate of the control point in double precision.

**Returns:**the Y coordinate of the control point.**Since:** 1.2

### getCtrlPt

public abstract [Point2D](http://docs.google.com/java/awt/geom/Point2D.html) **getCtrlPt**()

Returns the control point.

**Returns:**a Point2D that is the control point of this Point2D.**Since:** 1.2

### getX2

public abstract double **getX2**()

Returns the X coordinate of the end point in double precision.

**Returns:**the x coordiante of the end point.**Since:** 1.2

### getY2

public abstract double **getY2**()

Returns the Y coordinate of the end point in double precision.

**Returns:**the Y coordinate of the end point.**Since:** 1.2

### getP2

public abstract [Point2D](http://docs.google.com/java/awt/geom/Point2D.html) **getP2**()

Returns the end point.

**Returns:**a Point object that is the end point of this Point2D.**Since:** 1.2

### setCurve

public abstract void **setCurve**(double x1,  
 double y1,  
 double ctrlx,  
 double ctrly,  
 double x2,  
 double y2)

Sets the location of the end points and control point of this curve to the specified double coordinates.

**Parameters:**x1 - the X coordinate of the start pointy1 - the Y coordinate of the start pointctrlx - the X coordinate of the control pointctrly - the Y coordinate of the control pointx2 - the X coordinate of the end pointy2 - the Y coordinate of the end point**Since:** 1.2

### setCurve

public void **setCurve**(double[] coords,  
 int offset)

Sets the location of the end points and control points of this QuadCurve2D to the double coordinates at the specified offset in the specified array.

**Parameters:**coords - the array containing coordinate valuesoffset - the index into the array from which to start getting the coordinate values and assigning them to this QuadCurve2D**Since:** 1.2

### setCurve

public void **setCurve**([Point2D](http://docs.google.com/java/awt/geom/Point2D.html) p1,  
 [Point2D](http://docs.google.com/java/awt/geom/Point2D.html) cp,  
 [Point2D](http://docs.google.com/java/awt/geom/Point2D.html) p2)

Sets the location of the end points and control point of this QuadCurve2D to the specified Point2D coordinates.

**Parameters:**p1 - the start pointcp - the control pointp2 - the end point**Since:** 1.2

### setCurve

public void **setCurve**([Point2D](http://docs.google.com/java/awt/geom/Point2D.html)[] pts,  
 int offset)

Sets the location of the end points and control points of this QuadCurve2D to the coordinates of the Point2D objects at the specified offset in the specified array.

**Parameters:**pts - an array containing Point2D that define coordinate valuesoffset - the index into pts from which to start getting the coordinate values and assigning them to this QuadCurve2D**Since:** 1.2

### setCurve

public void **setCurve**([QuadCurve2D](http://docs.google.com/java/awt/geom/QuadCurve2D.html) c)

Sets the location of the end points and control point of this QuadCurve2D to the same as those in the specified QuadCurve2D.

**Parameters:**c - the specified QuadCurve2D**Since:** 1.2

### getFlatnessSq

public static double **getFlatnessSq**(double x1,  
 double y1,  
 double ctrlx,  
 double ctrly,  
 double x2,  
 double y2)

Returns the square of the flatness, or maximum distance of a control point from the line connecting the end points, of the quadratic curve specified by the indicated control points.

**Parameters:**x1 - the X coordinate of the start pointy1 - the Y coordinate of the start pointctrlx - the X coordinate of the control pointctrly - the Y coordinate of the control pointx2 - the X coordinate of the end pointy2 - the Y coordinate of the end point **Returns:**the square of the flatness of the quadratic curve defined by the specified coordinates.**Since:** 1.2

### getFlatness

public static double **getFlatness**(double x1,  
 double y1,  
 double ctrlx,  
 double ctrly,  
 double x2,  
 double y2)

Returns the flatness, or maximum distance of a control point from the line connecting the end points, of the quadratic curve specified by the indicated control points.

**Parameters:**x1 - the X coordinate of the start pointy1 - the Y coordinate of the start pointctrlx - the X coordinate of the control pointctrly - the Y coordinate of the control pointx2 - the X coordinate of the end pointy2 - the Y coordinate of the end point **Returns:**the flatness of the quadratic curve defined by the specified coordinates.**Since:** 1.2

### getFlatnessSq

public static double **getFlatnessSq**(double[] coords,  
 int offset)

Returns the square of the flatness, or maximum distance of a control point from the line connecting the end points, of the quadratic curve specified by the control points stored in the indicated array at the indicated index.

**Parameters:**coords - an array containing coordinate valuesoffset - the index into coords from which to to start getting the values from the array **Returns:**the flatness of the quadratic curve that is defined by the values in the specified array at the specified index.**Since:** 1.2

### getFlatness

public static double **getFlatness**(double[] coords,  
 int offset)

Returns the flatness, or maximum distance of a control point from the line connecting the end points, of the quadratic curve specified by the control points stored in the indicated array at the indicated index.

**Parameters:**coords - an array containing coordinate valuesoffset - the index into coords from which to start getting the coordinate values **Returns:**the flatness of a quadratic curve defined by the specified array at the specified offset.**Since:** 1.2

### getFlatnessSq

public double **getFlatnessSq**()

Returns the square of the flatness, or maximum distance of a control point from the line connecting the end points, of this QuadCurve2D.

**Returns:**the square of the flatness of this QuadCurve2D.**Since:** 1.2

### getFlatness

public double **getFlatness**()

Returns the flatness, or maximum distance of a control point from the line connecting the end points, of this QuadCurve2D.

**Returns:**the flatness of this QuadCurve2D.**Since:** 1.2

### subdivide

public void **subdivide**([QuadCurve2D](http://docs.google.com/java/awt/geom/QuadCurve2D.html) left,  
 [QuadCurve2D](http://docs.google.com/java/awt/geom/QuadCurve2D.html) right)

Subdivides this QuadCurve2D and stores the resulting two subdivided curves into the left and right curve parameters. Either or both of the left and right objects can be the same as this QuadCurve2D or null.

**Parameters:**left - the QuadCurve2D object for storing the left or first half of the subdivided curveright - the QuadCurve2D object for storing the right or second half of the subdivided curve**Since:** 1.2

### subdivide

public static void **subdivide**([QuadCurve2D](http://docs.google.com/java/awt/geom/QuadCurve2D.html) src,  
 [QuadCurve2D](http://docs.google.com/java/awt/geom/QuadCurve2D.html) left,  
 [QuadCurve2D](http://docs.google.com/java/awt/geom/QuadCurve2D.html) right)

Subdivides the quadratic curve specified by the src parameter and stores the resulting two subdivided curves into the left and right curve parameters. Either or both of the left and right objects can be the same as the src object or null.

**Parameters:**src - the quadratic curve to be subdividedleft - the QuadCurve2D object for storing the left or first half of the subdivided curveright - the QuadCurve2D object for storing the right or second half of the subdivided curve**Since:** 1.2

### subdivide

public static void **subdivide**(double[] src,  
 int srcoff,  
 double[] left,  
 int leftoff,  
 double[] right,  
 int rightoff)

Subdivides the quadratic curve specified by the coordinates stored in the src array at indices srcoff through srcoff + 5 and stores the resulting two subdivided curves into the two result arrays at the corresponding indices. Either or both of the left and right arrays can be null or a reference to the same array and offset as the src array. Note that the last point in the first subdivided curve is the same as the first point in the second subdivided curve. Thus, it is possible to pass the same array for left and right and to use offsets such that rightoff equals leftoff + 4 in order to avoid allocating extra storage for this common point.

**Parameters:**src - the array holding the coordinates for the source curvesrcoff - the offset into the array of the beginning of the the 6 source coordinatesleft - the array for storing the coordinates for the first half of the subdivided curveleftoff - the offset into the array of the beginning of the the 6 left coordinatesright - the array for storing the coordinates for the second half of the subdivided curverightoff - the offset into the array of the beginning of the the 6 right coordinates**Since:** 1.2

### solveQuadratic

public static int **solveQuadratic**(double[] eqn)

Solves the quadratic whose coefficients are in the eqn array and places the non-complex roots back into the same array, returning the number of roots. The quadratic solved is represented by the equation:

eqn = {C, B, A};  
 ax^2 + bx + c = 0

A return value of -1 is used to distinguish a constant equation, which might be always 0 or never 0, from an equation that has no zeroes.

**Parameters:**eqn - the array that contains the quadratic coefficients **Returns:**the number of roots, or -1 if the equation is a constant**Since:** 1.2

### solveQuadratic

public static int **solveQuadratic**(double[] eqn,  
 double[] res)

Solves the quadratic whose coefficients are in the eqn array and places the non-complex roots into the res array, returning the number of roots. The quadratic solved is represented by the equation:

eqn = {C, B, A};  
 ax^2 + bx + c = 0

A return value of -1 is used to distinguish a constant equation, which might be always 0 or never 0, from an equation that has no zeroes.

**Parameters:**eqn - the specified array of coefficients to use to solve the quadratic equationres - the array that contains the non-complex roots resulting from the solution of the quadratic equation **Returns:**the number of roots, or -1 if the equation is a constant.**Since:** 1.3

### contains

public boolean **contains**(double x,  
 double y)

Tests if the specified coordinates are inside the boundary of the Shape.

**Specified by:**[contains](http://docs.google.com/java/awt/Shape.html#contains(double,%20double)) in interface [Shape](http://docs.google.com/java/awt/Shape.html) **Parameters:**x - the specified X coordinate to be testedy - the specified Y coordinate to be tested **Returns:**true if the specified coordinates are inside the Shape boundary; false otherwise.**Since:** 1.2

### contains

public boolean **contains**([Point2D](http://docs.google.com/java/awt/geom/Point2D.html) p)

Tests if a specified [Point2D](http://docs.google.com/java/awt/geom/Point2D.html) is inside the boundary of the Shape.

**Specified by:**[contains](http://docs.google.com/java/awt/Shape.html#contains(java.awt.geom.Point2D)) in interface [Shape](http://docs.google.com/java/awt/Shape.html) **Parameters:**p - the specified Point2D to be tested **Returns:**true if the specified Point2D is inside the boundary of the Shape; false otherwise.**Since:** 1.2

### intersects

public boolean **intersects**(double x,  
 double y,  
 double w,  
 double h)

Tests if the interior of the Shape intersects the interior of a specified rectangular area. The rectangular area is considered to intersect the Shape if any point is contained in both the interior of the Shape and the specified rectangular area.

The Shape.intersects() method allows a Shape implementation to conservatively return true when:

* there is a high probability that the rectangular area and the Shape intersect, but
* the calculations to accurately determine this intersection are prohibitively expensive.

This means that for some Shapes this method might return true even though the rectangular area does not intersect the Shape. The [Area](http://docs.google.com/java/awt/geom/Area.html) class performs more accurate computations of geometric intersection than most Shape objects and therefore can be used if a more precise answer is required.

**Specified by:**[intersects](http://docs.google.com/java/awt/Shape.html#intersects(double,%20double,%20double,%20double)) in interface [Shape](http://docs.google.com/java/awt/Shape.html) **Parameters:**x - the X coordinate of the upper-left corner of the specified rectangular areay - the Y coordinate of the upper-left corner of the specified rectangular areaw - the width of the specified rectangular areah - the height of the specified rectangular area **Returns:**true if the interior of the Shape and the interior of the rectangular area intersect, or are both highly likely to intersect and intersection calculations would be too expensive to perform; false otherwise.**Since:** 1.2 **See Also:**[Area](http://docs.google.com/java/awt/geom/Area.html)

### intersects

public boolean **intersects**([Rectangle2D](http://docs.google.com/java/awt/geom/Rectangle2D.html) r)

Tests if the interior of the Shape intersects the interior of a specified Rectangle2D. The Shape.intersects() method allows a Shape implementation to conservatively return true when:

* there is a high probability that the Rectangle2D and the Shape intersect, but
* the calculations to accurately determine this intersection are prohibitively expensive.

This means that for some Shapes this method might return true even though the Rectangle2D does not intersect the Shape. The [Area](http://docs.google.com/java/awt/geom/Area.html) class performs more accurate computations of geometric intersection than most Shape objects and therefore can be used if a more precise answer is required.

**Specified by:**[intersects](http://docs.google.com/java/awt/Shape.html#intersects(java.awt.geom.Rectangle2D)) in interface [Shape](http://docs.google.com/java/awt/Shape.html) **Parameters:**r - the specified Rectangle2D **Returns:**true if the interior of the Shape and the interior of the specified Rectangle2D intersect, or are both highly likely to intersect and intersection calculations would be too expensive to perform; false otherwise.**Since:** 1.2 **See Also:**[Shape.intersects(double, double, double, double)](http://docs.google.com/java/awt/Shape.html#intersects(double,%20double,%20double,%20double))

### contains

public boolean **contains**(double x,  
 double y,  
 double w,  
 double h)

Tests if the interior of the Shape entirely contains the specified rectangular area. All coordinates that lie inside the rectangular area must lie within the Shape for the entire rectanglar area to be considered contained within the Shape.

The Shape.contains() method allows a Shape implementation to conservatively return false when:

* the intersect method returns true and
* the calculations to determine whether or not the Shape entirely contains the rectangular area are prohibitively expensive.

This means that for some Shapes this method might return false even though the Shape contains the rectangular area. The [Area](http://docs.google.com/java/awt/geom/Area.html) class performs more accurate geometric computations than most Shape objects and therefore can be used if a more precise answer is required.

**Specified by:**[contains](http://docs.google.com/java/awt/Shape.html#contains(double,%20double,%20double,%20double)) in interface [Shape](http://docs.google.com/java/awt/Shape.html) **Parameters:**x - the X coordinate of the upper-left corner of the specified rectangular areay - the Y coordinate of the upper-left corner of the specified rectangular areaw - the width of the specified rectangular areah - the height of the specified rectangular area **Returns:**true if the interior of the Shape entirely contains the specified rectangular area; false otherwise or, if the Shape contains the rectangular area and the intersects method returns true and the containment calculations would be too expensive to perform.**Since:** 1.2 **See Also:**[Area](http://docs.google.com/java/awt/geom/Area.html), [Shape.intersects(double, double, double, double)](http://docs.google.com/java/awt/Shape.html#intersects(double,%20double,%20double,%20double))

### contains

public boolean **contains**([Rectangle2D](http://docs.google.com/java/awt/geom/Rectangle2D.html) r)

Tests if the interior of the Shape entirely contains the specified Rectangle2D. The Shape.contains() method allows a Shape implementation to conservatively return false when:

* the intersect method returns true and
* the calculations to determine whether or not the Shape entirely contains the Rectangle2D are prohibitively expensive.

This means that for some Shapes this method might return false even though the Shape contains the Rectangle2D. The [Area](http://docs.google.com/java/awt/geom/Area.html) class performs more accurate geometric computations than most Shape objects and therefore can be used if a more precise answer is required.

**Specified by:**[contains](http://docs.google.com/java/awt/Shape.html#contains(java.awt.geom.Rectangle2D)) in interface [Shape](http://docs.google.com/java/awt/Shape.html) **Parameters:**r - The specified Rectangle2D **Returns:**true if the interior of the Shape entirely contains the Rectangle2D; false otherwise or, if the Shape contains the Rectangle2D and the intersects method returns true and the containment calculations would be too expensive to perform.**Since:** 1.2 **See Also:**[Shape.contains(double, double, double, double)](http://docs.google.com/java/awt/Shape.html#contains(double,%20double,%20double,%20double))

### getBounds

public [Rectangle](http://docs.google.com/java/awt/Rectangle.html) **getBounds**()

Returns an integer [Rectangle](http://docs.google.com/java/awt/Rectangle.html) that completely encloses the Shape. Note that there is no guarantee that the returned Rectangle is the smallest bounding box that encloses the Shape, only that the Shape lies entirely within the indicated Rectangle. The returned Rectangle might also fail to completely enclose the Shape if the Shape overflows the limited range of the integer data type. The getBounds2D method generally returns a tighter bounding box due to its greater flexibility in representation.

**Specified by:**[getBounds](http://docs.google.com/java/awt/Shape.html#getBounds()) in interface [Shape](http://docs.google.com/java/awt/Shape.html) **Returns:**an integer Rectangle that completely encloses the Shape.**Since:** 1.2 **See Also:**[Shape.getBounds2D()](http://docs.google.com/java/awt/Shape.html#getBounds2D())

### getPathIterator

public [PathIterator](http://docs.google.com/java/awt/geom/PathIterator.html) **getPathIterator**([AffineTransform](http://docs.google.com/java/awt/geom/AffineTransform.html) at)

Returns an iteration object that defines the boundary of the shape of this QuadCurve2D. The iterator for this class is not multi-threaded safe, which means that this QuadCurve2D class does not guarantee that modifications to the geometry of this QuadCurve2D object do not affect any iterations of that geometry that are already in process.

**Specified by:**[getPathIterator](http://docs.google.com/java/awt/Shape.html#getPathIterator(java.awt.geom.AffineTransform)) in interface [Shape](http://docs.google.com/java/awt/Shape.html) **Parameters:**at - an optional [AffineTransform](http://docs.google.com/java/awt/geom/AffineTransform.html) to apply to the shape boundary **Returns:**a [PathIterator](http://docs.google.com/java/awt/geom/PathIterator.html) object that defines the boundary of the shape.**Since:** 1.2

### getPathIterator

public [PathIterator](http://docs.google.com/java/awt/geom/PathIterator.html) **getPathIterator**([AffineTransform](http://docs.google.com/java/awt/geom/AffineTransform.html) at,  
 double flatness)

Returns an iteration object that defines the boundary of the flattened shape of this QuadCurve2D. The iterator for this class is not multi-threaded safe, which means that this QuadCurve2D class does not guarantee that modifications to the geometry of this QuadCurve2D object do not affect any iterations of that geometry that are already in process.

**Specified by:**[getPathIterator](http://docs.google.com/java/awt/Shape.html#getPathIterator(java.awt.geom.AffineTransform,%20double)) in interface [Shape](http://docs.google.com/java/awt/Shape.html) **Parameters:**at - an optional AffineTransform to apply to the boundary of the shapeflatness - the maximum distance that the control points for a subdivided curve can be with respect to a line connecting the end points of this curve before this curve is replaced by a straight line connecting the end points. **Returns:**a PathIterator object that defines the flattened boundary of the shape.**Since:** 1.2

### clone

public [Object](http://docs.google.com/java/lang/Object.html) **clone**()

Creates a new object of the same class and with the same contents as this object.

**Overrides:**[clone](http://docs.google.com/java/lang/Object.html#clone()) in class [Object](http://docs.google.com/java/lang/Object.html) **Returns:**a clone of this instance. **Throws:** [OutOfMemoryError](http://docs.google.com/java/lang/OutOfMemoryError.html) - if there is not enough memory.**Since:** 1.2 **See Also:**[Cloneable](http://docs.google.com/java/lang/Cloneable.html)

| | [**Overview**](http://docs.google.com/overview-summary.html) | [**Package**](http://docs.google.com/package-summary.html) | **Class** | [**Use**](http://docs.google.com/class-use/QuadCurve2D.html) | [**Tree**](http://docs.google.com/package-tree.html) | [**Deprecated**](http://docs.google.com/deprecated-list.html) | [**Index**](http://docs.google.com/index-files/index-1.html) | [**Help**](http://docs.google.com/help-doc.html) | | --- | --- | --- | --- | --- | --- | --- | --- | | | ***Java™ Platform***  ***Standard Ed. 6*** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| [**PREV CLASS**](http://docs.google.com/java/awt/geom/Point2D.Float.html)   [**NEXT CLASS**](http://docs.google.com/java/awt/geom/QuadCurve2D.Double.html) | [**FRAMES**](http://docs.google.com/index.html?java/awt/geom/QuadCurve2D.html)    [**NO FRAMES**](http://docs.google.com/QuadCurve2D.html)     [**All Classes**](http://docs.google.com/allclasses-noframe.html) |
| SUMMARY: [NESTED](#3znysh7) | FIELD | [CONSTR](#2et92p0) | [METHOD](#tyjcwt) | DETAIL: FIELD | [CONSTR](#4d34og8) | [METHOD](#17dp8vu) |

[Submit a bug or feature](http://bugs.sun.com/services/bugreport/index.jsp)

For further API reference and developer documentation, see [Java SE Developer Documentation](http://docs.google.com/webnotes/devdocs-vs-specs.html). That documentation contains more detailed, developer-targeted descriptions, with conceptual overviews, definitions of terms, workarounds, and working code examples.

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