MandelCanvas Components V 1.0.0 Documentation

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MandelCanvas Components is a set of flash components which allow you exploring formula fractals, such as the famous Mandelbrot Set and Julia Set in flashplayer. Mandel Canvas is a UI packing of asyncFormulaDrawer, and with the other 2 components providing ease-to-use interface. The base class asyncFormulaDrawer use the Boundary Tracing Tech to draw formula fractals. Since the low performance of actionscript on heavy calculation task, use the “Action Task Timeline Distribution Tech” also, to prevent flashplayer from being unresponsible when calculating pixels. The components are written in Actionscript 2.0 and implement the V2 component architecture, require Flash MX 2004 and flashplayer 7.0 up.

COMPONENT MandelCanvas
CLASS org.icube.fractal.components.MandelCanvas

Main component for drawing formula fractals in flashplayer.

METHODS

Method: start()

Start drawing.

Method: abort()

Abort drawing.

Method: back()

Move backward 1 step in the drawing history.

Method: forward()

Move forward 1 step in the drawing history.

Method: clearHistory()

Clear drawing history.

Method: setParameters(pObj:Object)

Set canvas drawing parameters, pObj is a object, which contain the parameters to be pass to MandelCanvas. For example, {iMax:128, maxDelay:80, XMin:-2.0, XMax:0.5, YMin:-1.25, Ymax:1.25} set the default drawing parameters. iMax sets the max iterations value for each caculated point, maxDelay is max delay time between 2 frames, XMin, XMax, YMin, YMax, set the canvas coordinates system min and max value.

Method: getParameters():Object

Get canvas drawing parameters which is returned as a object, see setParameters.

Method: setDivision(dir:String, rats:Array) or setDivision(dObj:Object)

Set canvas division. dir, take 2 string value (“H” or “V”), which indicate horizontal or vertical division. rats, is a array which contain ratios of each division border, (0 ~ 1). If use the second form, dObj, {direction:dir, ratios:rats}.

Method: getDivision():Object

Return division object of MandelCanvas.

Method: setFormula(f:Function)

Set formula function, raise error if set this when state is not 0 or 3. See asyncFormulaDrawer.

Method: getFormula():Function

Return formula function used by MandelCanvas.

Method: setColorMapping(f:Function)

Set color mapping function, raise error if set this when state is not 0 or 3. See asyncFormulaDrawer.

Method: getColorMapping():Function

Return color mapping function used by MandelCanvas.

Method: getProgress()

Return the drawing progress.

Method: getStats(sname:String)

Return the drawing statistics. sname take the string values listed below:

pCalc, calculated points number.
pFlood, flooded points number.
pTotal, total points number.
iCalc, calculated iterations number.
iFlood, flooded iterations number.
tracingTime, time used by boundary tracing, milliseconds.
drawingTime, time used by contour drawing, milliseconds.

PROPERTIES

Property: mode:Number

Set the mouse action mode. 0 for non-action mode; 1 for Point mode, which trigger “click” event when every click, see event; 2 for zooming mode, which zoom the fractal by zRatio when each mouse click; 3 for selection zooming mode, which zoom the canvas to the selected area.

Property: historyMode:Number

Set the history behavior mode. 0 for no history mode; 1 for the behavior of only remembering parameters settings; 2 for the full history mode, that remember formula and color mapping as well as parameters.

Property: showBgImage:Boolean

Indicate whether the background image will be show or not. Set it true to show or false to hide.

Property: state:Number

Indicate canvas state. 0 empty; 1 tracing; 2 drawing; 3 complete; 4 tracing aborted; 5 drawing aborted. Read only.

Property: selectedPoint:Object

Coordinates of the point selected by mouse click when mode 1, in the form of {x:x, y:y}.

Property: zRatio:Number

Set the zooming ratio used by mode 2.

Property: retainAspectRatio:Boolean

Set whether to retain aspect ratio or not when use mode 3.

EVENTS

Event: start

Triggered when start drawing.

Event: abort

Triggered when abort drawing.

Event: complete

Triggered when canvas complete the drawing task.

Event: click

Triggered when mode is set to 1 (Point Mode), and Mouse down on canvas. This event sends coordinates information within event object, you can retrieve those like this,

```
canvas.addEventListener("click", function(e){
	trace([e.pointX, e.pointY]);
}
```

COMPONENT MCControl
CLASS org.icube.fractal.components.MCControl

Component which provide graphic user interface for controlling MandelCanvas.

METHODS

Method: addButtonDefinition(name:String, defObj:Object)

Add custom button definition to control button definitions. Parameter name is string value which set button definition name, see controlButtonList. Parameter defObj must contain 2 or 3 members, icon:String, which set button icon clip linkage, callback:String or Function, which set the callback function, (If it's a string, call the class instance own method specified by the string, if it's a function, call the function when button down.) and a optional group:String, which specify the button group.

Method: removeButtonDefinition(name:String)

Remove button definition specified by the string parameter, name.

PROPERTIES

Property: controlButonList:Array

Set control buttons which will be placed in MCControl. Contain the string values of one or more of those: “ATART”, “ABORT”, “BACKWARD”, “FORWARD”, “POINT”, “ZOOM”, “RECT”, “SET”, “INFO”. Callback functions are defined as class methods with the names of “onButtonDown...”,for example, mcanvasInst.onButtonDownStart, callback for “SET” and “INFO” is empty function by default, you can redefine it.

Property: target:org.icube.fractal.components.MandelCanvas

Set the target. (As Target in inspector panel, Take string value of absolute reference, such as “_root.mcanvasInst”.)

COMPONENT MCProgress
CLASS org.icube.fractal.components.MCProgress

Component that display the drawing progress of MandelCanvas.

PROPERTIES

Property: target:org.icube.fractal.components.MandelCanvas

Set the target. (As Target in inspector panel, Take string value of absolute reference, such as “_root.mcanvasInst”.)

CLASS org.icube.fractal.MDFormulaDrawer

Class used by MandelCanvas, to draw formula fractals in a multi-division canvas.

CLASS org.icube.fractal.asyncFormulaDrawer

Class used by MDFormulaDrawer, to draw formula fractals in a undivided canvas.

This class has a set of static methods, for generating formula and color mapping functions, you can use these or define formula and color mapping yourself.

Formula:

static MANDEL():Function

Return classic Mandelbrot formula.

static JULIA(cR:Number, cI:Number):Function

Return classic Julia formula.

static iMANDEL():Function

Return inversed Mandelbrot formula.

static iJULIA(cR:Number, cI:Number):Function

Return inversed Julia formula.

static MANDEL_3():Function

Return z^3 Mandelbrot formula.

static JULIA_3(cR:Number, cI:Number):Function

Return z^3 Julia formula.

static MANDEL_4():Function

Return z^4 Mandelbrot formula.

static JULIA_4(cR:Number, cI:Number):Function

Return z^4 Julia formula.

static inverseFormula(f:Function):Function

Return inversed formula of given formula function.

static cMANDEL()

Return conjugate Mandelbrot formula.

static cJULIA(cR:Number, cI:Number)

Return conjugate Julia formula.

static NMANDEL(n:Number):Function

Return z^n Mandelbrot formula.

static NJULIA(cR:Number, cI:Number, n:Number):Function

Return z^n Julia formula.

static cNMANDEL(n:Number):Function

Return conjugate z^n Mandelbrot formula.

static cNJULIA(cR:Number, cI:Number, n:Number):Function

Return conjugate z^n Julia formula.

Color Mapping:

static RAINBOW(suppr:Number, offset:Number):Function

Return rainbow color mapping. Parameter suppr (0 ~ 360) specify the color range will not be used, offset (0 ~ 360) specify the color offset. For example, RAINBOW(40, 270).

static RAINBOWX(suppr:Number, offset:Number, S:Number, L:Number, bgH:Number, n:Number)

Similar to RAINBOW color mapping, added by 4 parameters. Parameter S (0 ~ 100) specify S value of HSV, L specify L value of HSV, bgH (0 ~ 360) set the background color, (color when iter >= iMax), and parameter n specify n times that rainbow repeated.

static GRAYSCALE():Function

Return grayscale color mapping.

***Note: For custom Formula and Color Mapping*.**

A formula function must take 2 parameters which retrieve x and y coordinates of the point to be calculated and return a number value of iterations. In the function use this.iMax to retrieve iMax of the class instance. A color mapping function must take 1 parameter which retrieve iter value of the point (or area) and return RGB color value (0x000000 ~ 0xFFFFFF). Use this.iMax to retrieve iMax as well.

Example:

```
var f=function(X, Y){
        var i = 0;
        var zx = 0, zy = 0;
        while (zx*zx+zy*zy<4 && i<this.iMax) {
                var R = zx*zx-zy*zy+X;
                var I = 2*zx*zy+Y;
                zx=R, zy=I;
                i++;
        }
        return i;
}
var c=function(iter){
        var W = 255*(1-iter/this.iMax);
        return (W << 16)+(W << 8)+W;
}
mandelCanvasInst.setFormula(f);
mandelCanvasInst.setColorMapping(c);
```

Note:

Mandel Canvas Components extends mx.core.UIComponent class, but **NOT** implement skinning and style setting currently.

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