

## Using Variables in the Discovery-1 Software to Create Concentric Regions

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### Abstract

This article describes the Discovery-1 software's journals using variables to create concentric regions on an image. This application requires the dropin "mmvar." A typical application for the concentric regions would be to measure the distribution of a probe at varying distances from a central location as occurs with neuronal transport or fluorescence recovery after photobleaching. After creating the concentric regions you can run a journal using loop for all regions (journal menu) to make measurements at different distances from the center.

### Instructions

#### Main journal

First set up the variables you will need for this process using multiple Assign Variable (journal menu) commands. Set up the following variables:

| Variable name        | Variable description                   |
|----------------------|--|
| centerX, centerY     | X, Y center for the concentric regions |
| deltadiameter        | distance between each region           |
| diameterX, diameterY | the smallest diameter of the regions   |
| numregions           | number of concentric regions           |

You could set up a journal to make these assignments and these variables could be entered manually at the start of the journal by using Enter Variable (Journal menu). The following variables can be calculated based upon the first set of variables.

| Variable name    | Variable definition                  |
|------------------|--------------------------------------|
| radiusX, radiusY | diameterX / 2, diameterY / 2         |
| topx, topy       | centerX - radiusX, centerY - radiusY |

The journal will need to load either an oval or rectangular region. Save a previously created oval or rectangle region or ask the user to put a rectangle or oval region on the image during a Show Message and Wait (Journal menu), then use Save region (Edit menu).

Loop variable (Journal menu): for i equals 2 to numregions step 1: run the journal Load Region Loop for all regions (Journal menu): run the journal Move and Resize Region

**Keywords:** discovery-1 software techniques

**Issue Type:** analysistools

## Discovery-1 Online Support

When finished the main journal should look similar to this:

```
ShowMessageAndWait("Place a rectangular or circular region around the area to be covered. ", NOWAIT)
SaveRegions([Current At Start], "temporary")
centerX = $Region.Left$ + ($Region.Width$/2)
centerY = $Region.Top$ + ($Region.Height$/2)
diameterX = $Region.Width$
diameterY = $Region.Height$
DeltaDiameter = AskForNumber("Please enter the amount of growth")
NumRegions = AskForNumber("Please enter the number of regions")
topx = centerX - (diameterX/2)
topy = centerY - (diameterY/2)
FOR i = 2 TO NumRegions RunJournal("Load Region") NEXT
LoopRegions([Current At Start], "Size and Place Regions")
ResequenceRegionLabels([Current At Start])
```

You will also need the following two journals:

### **Journal: Load Region**

Load region (Edit menu) loads the saved region.

```
OpenRegions([Current At Start], "temporary")
```

### **Journal: Move and Resize Region**

The journal consists entirely of the following Assign Variable commands.

```
$Region.Height$ = diameterY
$Region.Width$ = diameterX
diameterX = diameterX + deltadiameter
diameterY = diameterY + deltadiameter
$Region.Left$ = topx
$Region.Top$ = topy
topx = topx - (deltadiameter/2)
topy = topy - (deltadiameter/2)
```

| Variable name     | Variable definition         |
|-------------------|-----------------------------|
| \$Region.Height\$ | diameterY                   |
| \$Region.Width\$  | diameterX                   |
| diameterX         | diameterX + deltadiameter   |
| diameterY         | diameterY + deltadiameter   |
| \$Region.Left\$   | topx                        |
| \$Region.Top\$    | topy                        |
| topx              | topx - ( deltadiameter / 2) |
| topy              | topy - ( deltadiameter / 2) |

### **Journals**

To save these journals onto your computer, right-click each link and select "Save Target As..."

- ◆ [Concentric Regions](#)
- ◆ [Load Regions](#)
- ◆ [Size and Place Regions](#)