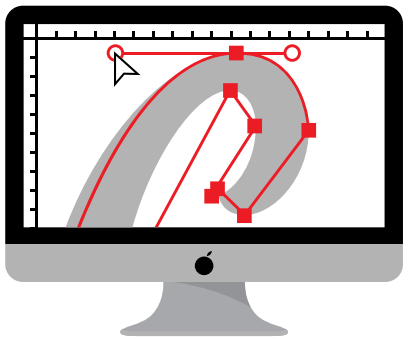
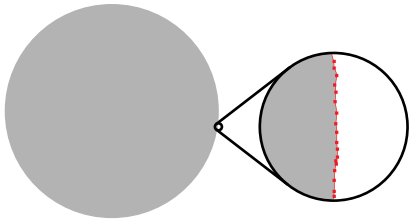
The Ultimate Guide to The Bézier Method (for lettering)



So you want to know how to digitize your lettering work, huh? Well you've purchased the right zine!

This is an in-depth guide to what is often referred to as The Bézier Method. This method is widely used by lettering artists and typographers alike to create consistency and simplicity in their letterforms.

Before we start, we have to address the vector-based elephant in the room... Adobe Illustrator's image trace feature. It is a well-known process that can quickly turn any raster- or pixel-based image into a vector graphic.



A preview of raster image that has digitized using image trace in Adobe Illustrator.

It's done with the single click of a button and, depending on the quality of the original raster image, it might even *look* perfect. It's not until you take a closer look that you can see how inaccurate it actually is. This method can be useful in some situations but it often results in lots of excess nodes (you'll learn about those later). This is problematic when it comes to editing and refining. It will force you to move, alter and even delete many anchor points in order to create a relatively smooth curve.

So why do we use The Bézier Method? Because it helps us define the edges of shapes and gives each curve proper structure while making it easily editable.

Don't worry, I'll explain...

About This Process.

If you're seeking advice from this guide, you have probably seen seen something similar to this (Figure 1) when it comes to the vectorization of type. You may have wondered, "How do they do that?" Or maybe even, "What's the point?" (pun intended). Well, the reason for spending so much time doing it is twofold. First, it reduces the total number of anchor points in a single piece, making it easy to adjust curves while maintaining proper structure. Secondly, beginners often struggle with finding a starting point when it comes to digitizing their type. It creates a concrete method and a place to start with each letter. It's what I refer to as **The 90° Method**. But first, let's start at the beginning.

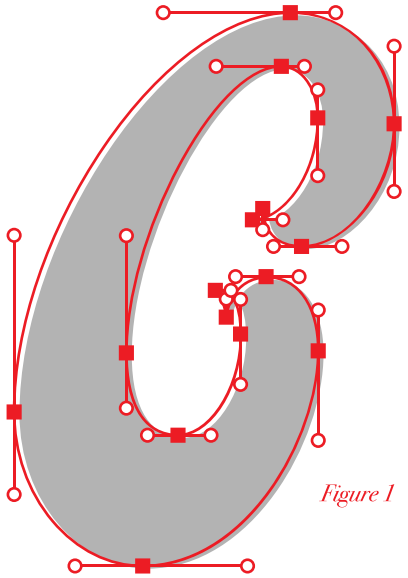


Figure 1

Let's Talk About Béziers.

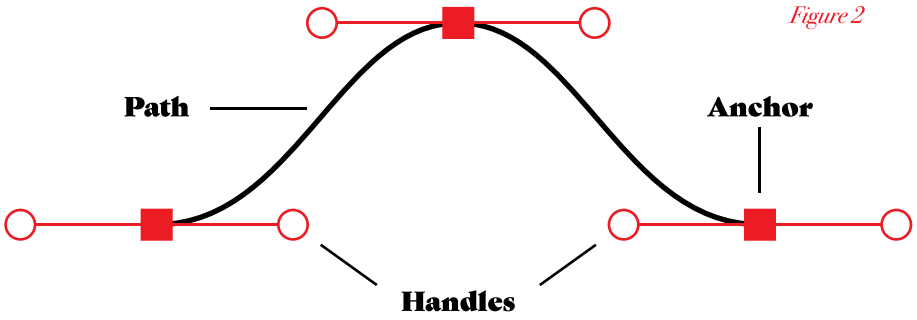


Figure 2

A Bézier curve is a mathematical method for drawing curves created by Pierre Bézier. Curves are created by drawing a line in between two points—called anchors—and altered by the handles on each of the points (Figure 2).

All basic, 2D geometric shapes are created by anchor points and Bézier curves.

Let's Do Some Math!

Remember anything about algebra? You know, that one class you hated in middle school?

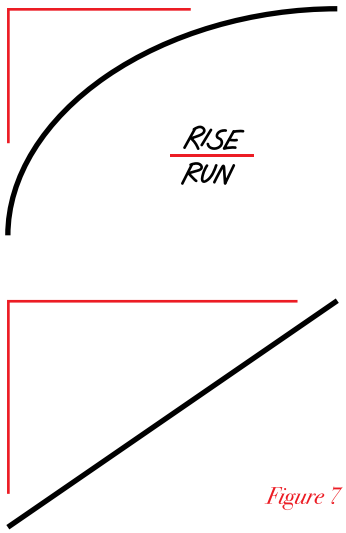


Figure 7

Well, what you should have learned was that every line, straight or curved, has a slope. Slope is defined as the change in value on the x-axis divided by the change in value on the y-axis. A simpler way to remember this is "rise over run." If the change in value of both the x and y axes are positive, the slope is positive. If either of them are negative, the slope is negative. Why is this even worth mentioning? First off, it makes it look like I paid attention in middle school math classes. Secondly, knowing every point in which the slope changes from negative to positive is important because the point in which it shifts is at the extreme. This is known as an extremum.

Like I said before, Béziers curves are a mathematical equation for defining a line. Although we don't need to know algebra to draw letters (thank God), this is helpful to recognize when a curve changes directions.

So every time the slope changes (i.e., any change of direction), the line needs a little bit of support, and there should be an anchor point placed there.

Defining the Extremes.

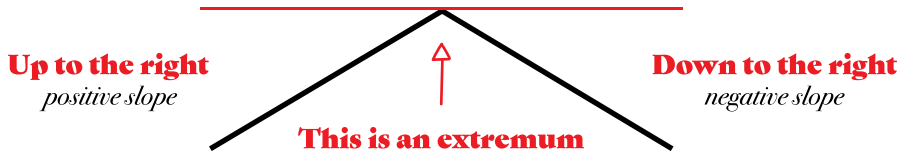


Figure 8.a

As you'll notice, the line starts out moving up and to the right before switching and starting to move down to the right (figure 8.a).

The same thing happens here at the bottom (Figure 8.b) on a curved line. The line starts out moving down and to the right before switching and starting to move up to the right.

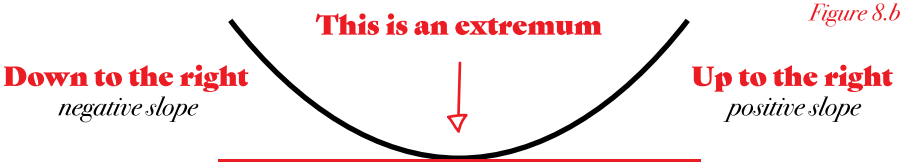


Figure 8.b

But this rule doesn't just apply to top and bottom of forms, but also to the left and right of each one as well (Figure 8.c).

Any time that the slope changes from positive, to negative, there is an extrema.

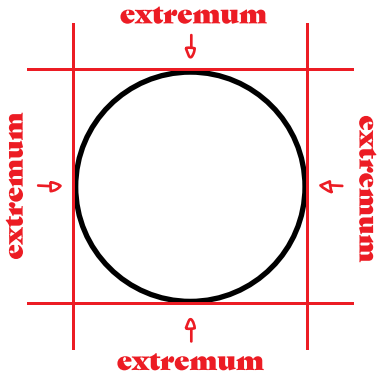


Figure 8.c

Finding Your Extrema (pt 1).

There are two ways to easily define those extrema when it comes to letterforms. The first is the easiest, but will leave a lot of fingerprints on your computer screen. When looking at whatever you need to digitize, simply follow the line with your finger. Pay attention to which direction you're moving in, and say aloud which direction your finger is moving in.

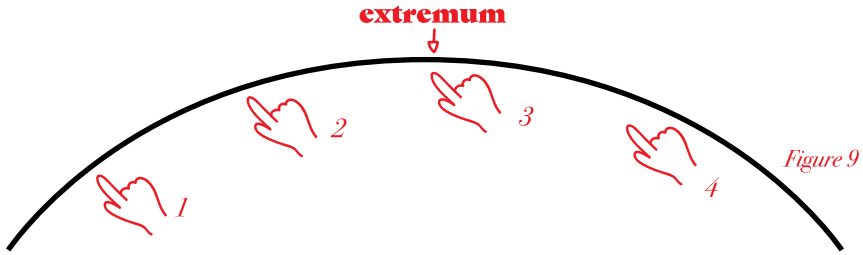


Figure 9

1)"Up to the right." 2)"Up to the right." 3)"I've stopped moving." 4)"Down to the right."

As you are following along here (Figure 9), your finger keeps moving up and to the right. The moment your finger is no longer moving up, but down, the slope has gone from a positive value to a negative value. This is an extremum.

Finding Your Extrema (pt 2).

The second method is super simple too, but can look a bit overwhelming when working with more than one letter at a time. This method is done by using guides. To make them visible go to View > Guides > Show Guides. Start by dragging guides from your rulers (View > Rulers > Show Rulers to make visible) until it touches the letterform. Start with a single letter. Wherever it touches a letterform there is an extremum.

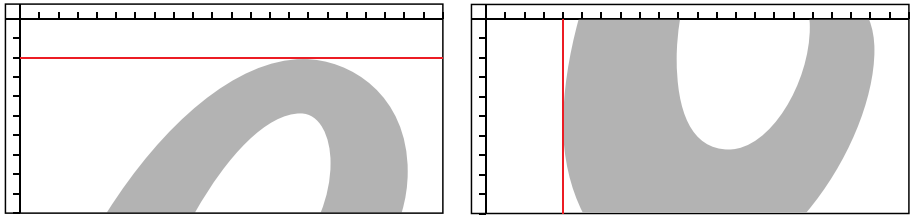


Figure 10.a

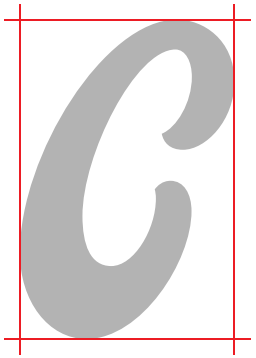


Figure 10.b

Unfortunately, Adobe Illustrator only has the rulers on the top and left sides. You can start by dragging one from the top until it touches the letterform and one from the left until it does the same. To find the extremas at the right and the bottom, you have to drag a guide across the form completely and then move it back until it touches the letterform.

Done? Okay, great! But you're only part of the way there. While we have defined the exterior extrema (Figure 10.b), we know that there are others.

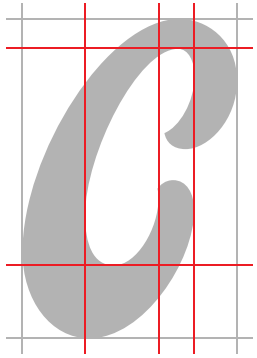


Figure 10.c

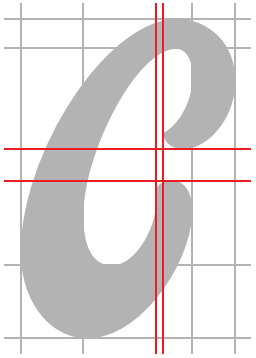


Figure 10.d

Once again, *every* time a line has a change in slope or direction, there is an extremum. This means that there are extrema inside of individual forms, too. After placing your guides, we now have to look at the interior ones. I always start by following the exterior line of the form, dragging guides until it touches each time, vertically or horizontally, but do whatever works for you.

Penning Out the Form.

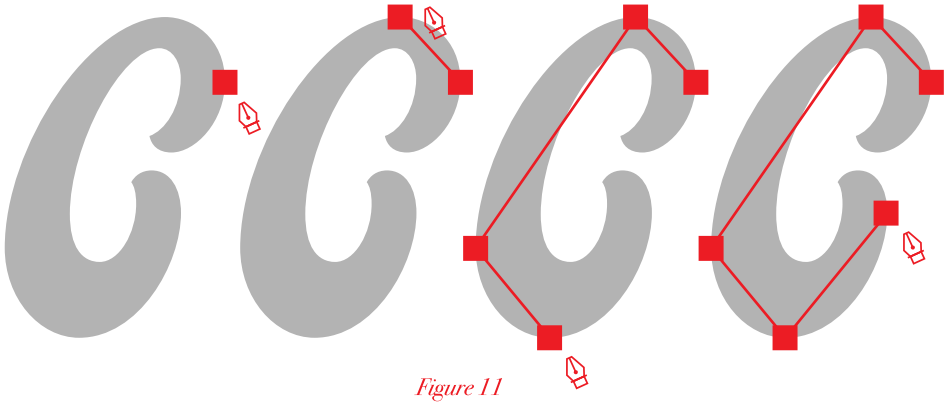


Figure 11

Now that we have defined our extremum, it's time to start penning out the form. Bring up the Pen Tool (P) and start at any extremum on the letterform. Remember, that is any place where the slope changes directions or the guide meets the letterform. Simply click and let go without dragging. Continue around the form placing an anchor point at each of the extrema. Don't worry about a smooth form (yet); we will take care of that later.

Reminder:

Always close your paths by finishing in the same place you started.

Now that we have penned the outside extrema, we get to our first corner and there are two ways to go about it...

The first is to simply add a point at the corner and continue around the form *(Figure 12.a)*. It's the way you'll see most people do it, but there is a slightly more advanced technique and it's called "overshooting" *(Figure 12.b)*. Don't worry, I'll explain.

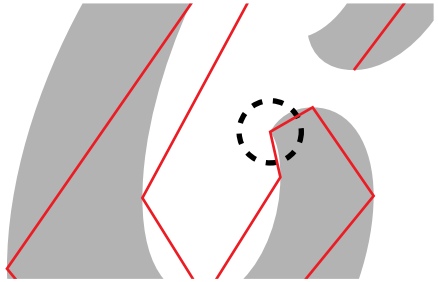


Figure 12.a

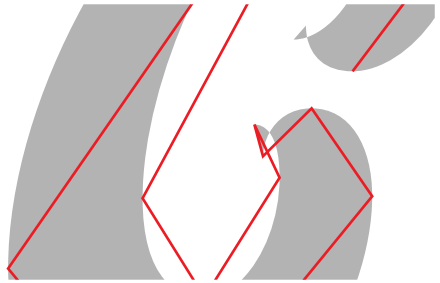


Figure 12.b

Overshooting Your Corners.

As we discussed before, there should be an anchor point every time the line changes directions, creating an extremum. Well, there's a bit of a conflict when it comes to a sharp corner (Figure 13.a).

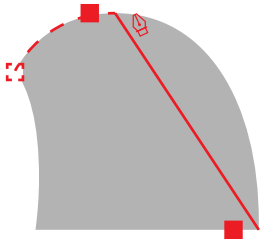


Figure 13.a

Technically, the extremum of the left side of the next curve *would be* beyond the joint itself (Figure 13.b). Because of this, we should place the anchor point where the line would theoretically change directions if we continued it past this joint.

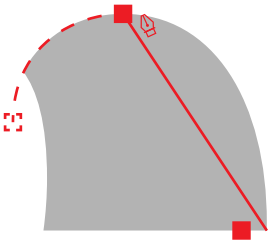


Figure 13.b

The same applies for the bottom side of the curve, beneath the joint. If we follow it upward, it would theoretically change directions above the joint, so we place our next anchor point there (Figure13.c).

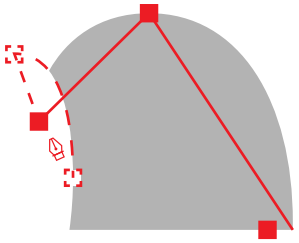


Figure 13.c

When done correctly, the resulting path would create a triangle outside of the actual letterform itself (Figure 13.d). Once finished, we simply merge the final form and delete the triangle, creating the desired corner (Figure 13.e).

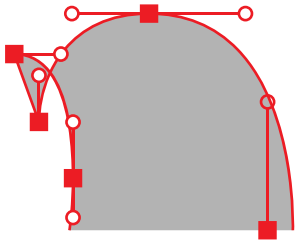


Figure 13.d

One might ask, "Why not just put an anchor point at the corner and not worry about that silly 90º Method?"

The simple answer is that you could. But the reason why is so that a single point doesn't affect both sides of the form. The overshoot method allows you to control both sides independently.

See "Crossover Technique on pg. 12 for additional explanation)

Figure 13.e

Penning Out the Form (cont'd)...

Okay, we've addressed the first corner. Now it's time to pen out the rest of the extrema by continuing placing an anchor point at each of them. Once you've penned all the way around the form, return to the point where you started to complete the path. Now we can begin smoothing out the curves. Bring up the Anchor Point Tool (Shift + C). Start one point at a time clicking on the anchor and dragging. Hold Shift while doing so in order to keep your handles locked at 0º, 45º, or 90º. This will create handles on the anchor point that will produce a curve as a resulting path. After creating handles for each point, you can use the Direct Selection Tool (A) to tweak each side individually. Be sure to continue to hold Shift as you edit.

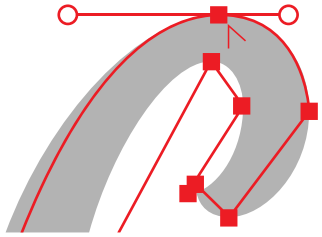


Figure 14

You'll continue doing it for each point along the path. After a lot of anchor point converting, and even more refining, you will have something that looks like the original sketch and you can move on to the next letter.

Reminder:

This is the part of the process that takes the longest. If you start to notice small kinks or flat areas in the curve, continue adjusting the handles that create it. Getting it right on the first try rarely happens.

The 90º Method.

This is where the "90º Method" comes into play. With this method, the goal is to keep as many handles as possible locked to 0º, 45º, or 90º. By doing so, you will find it easier to address each curve individually. This is done by simply holding down the Shift key every time you go to adjust a handle.

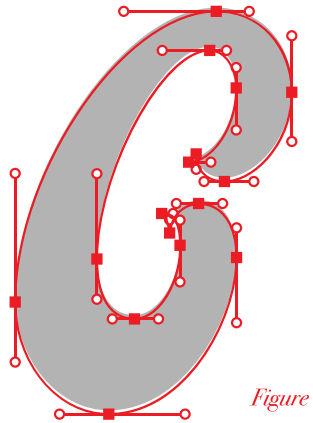


Figure 15

Some people find this to be unnecessary, but I would say that this method gives each letterform a structure that is easy to analyze and refine. Of course, you will never be able to keep *all* your handles locked at those angles, but this method will work for the majority of the pieces you create. Some curves are a little too complex, so always use your best discretion.

This is just a taste. For the full version of this booklet (and a few more tips + tricks) be sure to visit my website!

www.adehogue.com/shop/beziermethod