

Creating Patterns

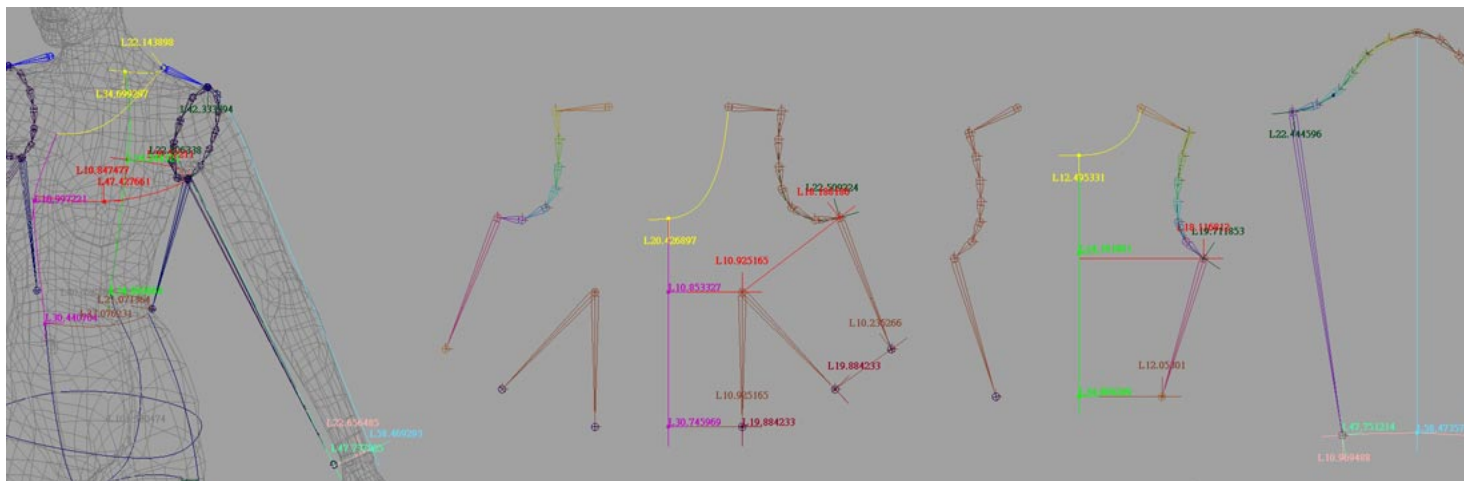


Figure 1. Measurement and pattern outlines

Basically, it involves making body measurements and laying out flat patterns. So the first step is to prepare and rig your character. The character must be in a standing pose of course. But the arms should be pointing downwards at an angle (see Figure 1). Because this would affect the inside and outside lengths of the sleeves and the lengths would affect the appearance of wrinkles under the armpit for different arm poses.

The scale of the character is important because it would affect the parameters used in the nCloth nodes. The best thing to do is to use real life scale and unit should better be centimeter in order to minimized loss in resolution due to rounding in numbers. But whether to change Space Scale in the nucleus node for physically correct simulation is another issue. The use of real scale for the character is just to make things consistent.

A basic blouse is composed of four patterns: front, back and a pair of sleeves. In Figure 1, you can see what measurements are required and how they're translated into flat patterns (see the matching colors). As this is a ladies' blouse, there's a cut (brown) in the front pattern below the chest line (red) in order to make room for the breasts. You can learn more about this kind of fitting technique in most garment manufacturing literatures (or by disintegrating your own clothes). You should refer to them for better understanding of the principles.

To make measurement, you can create curves and use arc length tool to find out their lengths. Then create curves in the front view port to outline patterns, measure their lengths using arc length tool, match their lengths with those around the body manually. But lengths can never be matched precisely. This doesn't matter as long as they're within a tolerable difference. Care should be taken if the edge is a seam (where stitch exists).

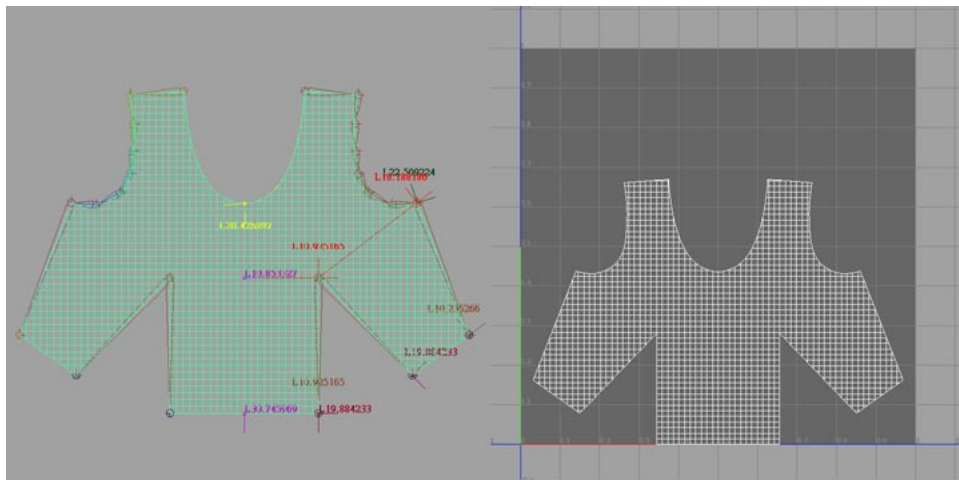


Figure 2. Front pattern for blouse

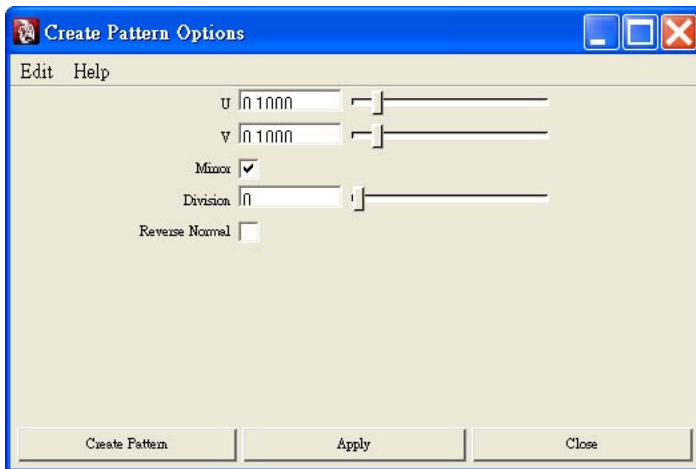
After outlining the patterns, make sure the curves are touching and planar. Then create a NURBS plane to cover the curves. Its width-length ratio must be equal to 1 so as to prevent UV distortion. UV divisions are equal to the width and length respectively so that the patterns are composed of 1-cm squares (see Figure 2). This is intentional because cloth simulation can perform better if the topology is composed of squares. To obtain finer wrinkles, you can increase UV divisions.

Project the curves onto the plane, trim it, and convert it into polygon. You can see the faces at the borders are irregular in shape (eg. triangles, pentagons, etc), which is fine. Although non-quad faces are not desirable, they are unavoidable. They're allowed to exist at the borders so that the majority of the area is covered with squares.

Mirror the polygon patch if necessary. Remember to modify UV (normalize and pivot at U=0.5) after mirroring as shown in Figure 2. Don't forget to reverse normal for back pattern. Also make sure different patterns have the same scale in UV space. The simplest way to do this is to combine them into one single object, then create UV by projection. Combining patterns can not only match their UV scale, but also ease nCloth creation. Because only one nCloth node is needed to deform a single piece of garment as all patterns are sharing the same nCloth settings.

Scripted workflow

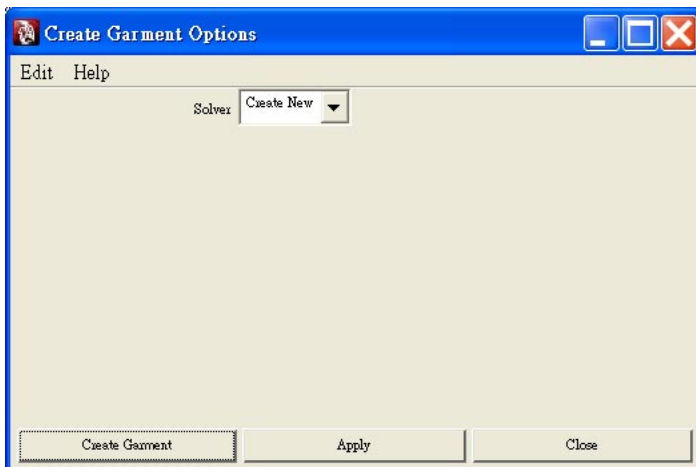
The work described above have been automated with the jc.clothes -> Create Pattern command. See its option box below:



After outlining the pattern, select all curves and invoke the command. Turn on 'Mirror' if it's just the outline of the left side. Turn on 'Reverse Normal' if it's a back pattern. 0 in 'Division' means 1-cm squares. As it creates and trims a NURBS object before converting it into polygon, you must indicate which part of the NURBS plane (by specifying a point in UV) is chosen in the trim command. The U and V parameters in the option box are to let you do this. Try to adjust them if you can't obtain the piece you expect.

This command would create an attribute jcPattern on the input curves and connect this attribute to the resulting pattern. This is to preserve relation between curves and pattern so that the latter can be found via the curves in later commands.

Garment is a single object composed of patterns. So creation of garment includes combining patterns. To create garment, select all patterns and then invoke the command jc.clothes -> Create Garment whose option box is shown below:



After combining patterns, this command would create UV by projection and then create nCloth. The connections between the patterns and the curves would be rebuilt to point to the new object. If there's only one pattern in the garment (eg. a belt), you can still use this command to setup nCloth properly.

Normally nCloth is created after binding because skin cluster deforms object before nCloth. If nCloth is created before skin cluster, the latter must deform the intermediate object (inMesh of nCloth node). This will be taken care of by the command jc.clothes -> Create Stitches which will be explained in next section.

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