The Lutterloh dress patterns: An unexpected application of polar co-ordinates

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The Lutterloh method of making dress patterns was developed in Germany in the 1930s, and even back then there were classes held in Australia in its use. However, the time was hardly propitious for such cultural dissemination, and it is only in recent years that it is making a reappearance here.

The underlying principle involves the modification of basic designs and it is claimed that it provides better fits for women of different sizes and shapes than do other commercially available patterns. The method is marketed via classes conducted on a commercial basis and makes use of kits sold at these classes.

Each kit comprises a set of basic patterns (here called "templates") together with specially modified tape measures and various other items. The copyright is held by Modeverlag Lutterloh and because of the commercially sensitive nature of the material, not all details can be given here, but enough can be said to enable an appreciation of the underlying mathematics.

Consider a "basic" dress. Our usual understanding is that the fit is determined by a number of parameters, most notably measurements of bust, waist and hips. The Lutterloh method replaces these three with two, referred to as "bust" and "hips," but each with a somewhat different meaning from the usual. The "bust" measurement provides the means to modify the top of the dress, while the "hips" measurement applies to the lower part.

The pattern is constructed by using a basic template, but modifying it to suit individual requirements. One part of the template applies to the top of the dress, and the other to the bottom.

The basic pattern applies exactly if b, the "bust" measurement is 96 cm. The template comprises a set of points. Each point P is associated with a numerical value r. The various points P are displayed on the template in relation to a further point, labelled on the template with a cross. This extra point plays the part of an origin, and here to be called O. The pattern is constructed by taking a measure and marking off a point r cm from the origin, in the direction OP, for each of the points P. Readers will recognise the basic principle at work here as that by which a curve is plotted on polar co-ordinate axes.

Table 1 was constructed by taking measurements of one such template. The values of the angle θ given in the table were found by applying a protractor to the template; the values of *r* are those supplied by Modeverlag Lutterloh as part of the template. The standard convention (reference axis horizontally to the right) is here used. The plot applies to one half of the front of the dress.

In the event that the woman for whom the dress is designed has a "bust" larger than 96 cm, the numbers in the second column above must be adjusted, by increasing them somewhat. This is done by means of a modified tape measure. However, it can be discovered, by checking the dimensions of this piece of equipment, that the modification may be achieved by replacing the standard value of *r* as given in the second column of the table above by the adjusted value

Table 1. Polar co-ordinates derived from one of the templates (pattern no. NN85).

TOP		BOTTOM	
θ	r	θ	r
119°	29.0	−19°	14.5
109°	28.0	−56°	28.0
101°	30.0	−73°	24.5
96°	33.5	−90°	22.5
78°	30.5	−107°	25.0
75°	23.0	−118°	27.5
70°	16.5		
60°	15.5		
42°	17.5		
32°	16.0		
25°	14.5		

$$r + \frac{7(b-96)}{46}$$

where *b* is the measured "bust." In the case when *b* < 96, the same formula applies, but the second term is negative.

For the lower half of the dress, the same procedure is used, this time using the fourth column, and with the "hips" measurement *h* replacing *b*.

Interpolation between the plotted points is achieved either by straight-line connections or else by means of curved joins made with the use of a French curve, supplied as part of the pattern-making kit. A straight join from the first point of the "top" pair of columns to the final point of the "bottom" pair completes the pattern.

Although no further mathematical analysis is involved and although I have no competence to offer any opinion on the merits or otherwise of the method, I nonetheless found it interesting to see polar co-ordinates turning up in such an, at first sight, unlikely context.

Acknowledgement