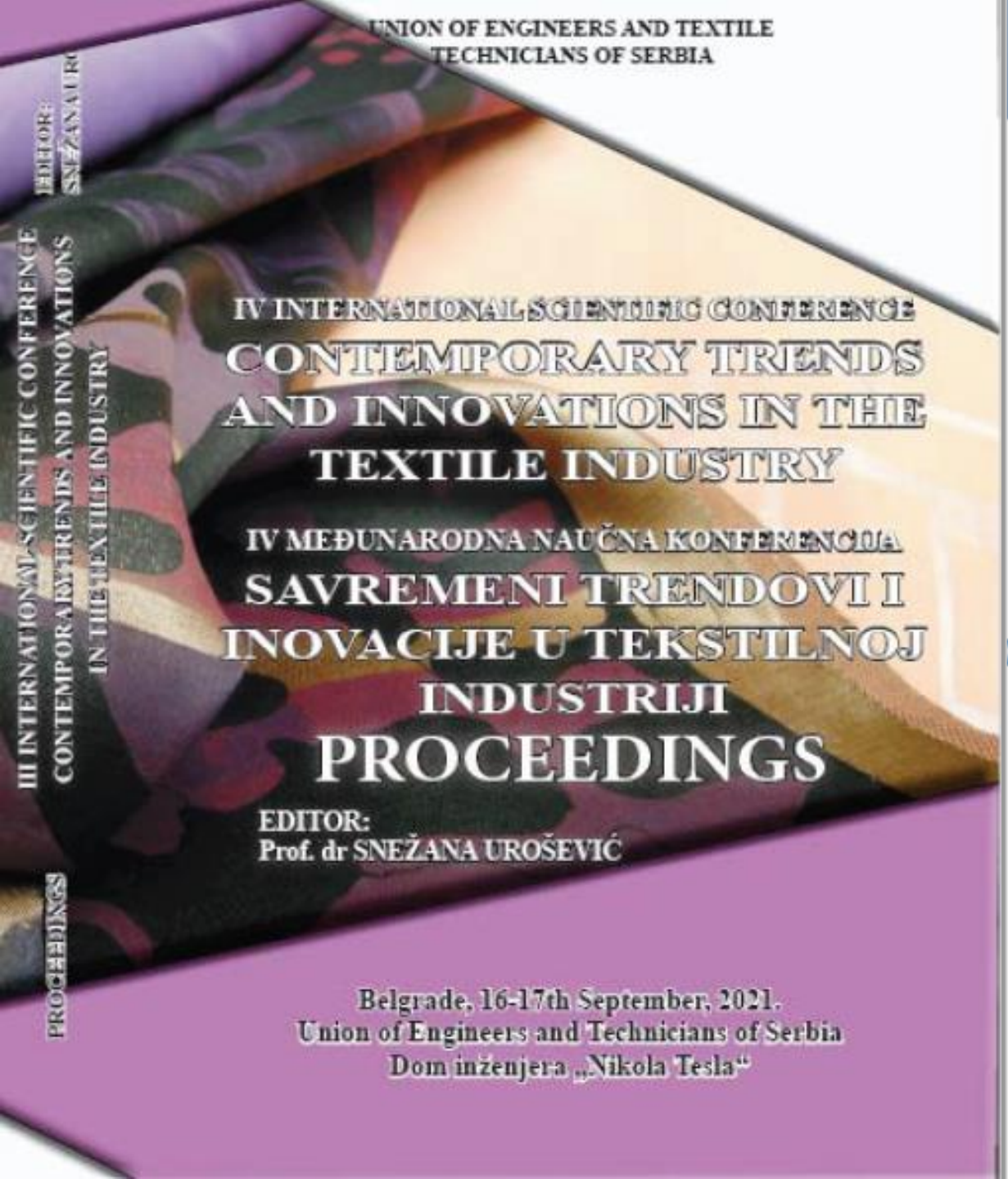

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IMPACT OF THE TYPE OF CUTING LAYOUT ON THE CONSUMPTION OF TEXTILE MATERIAL

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ABSTRACT: In this paper the influence of the types of the cutting layouts on the consumption of the textile material used for sewing an order of women's pants with different type of cutting layouts are analyzed. The affect of using less and more confection sizes contained in the cutting layouts and the type of cutting layouts in the consumption of the fabric is given.

Keywords: *fabric, women's pants, arrangement, savings.*

UTICAJ VRSTE KROJNE SLIKE NA POTROŠNJU TEKSTILNOG MATERIJALA

APSTRAKT: U ovom radu je analiziran uticaj vrsta rasporeda kroja na potrošnju tekstilnog materijala koji se koristi za šivenje porudžbine ženskih pantalona sa različitim vrstama rasporeda krojnih delova. Takođe je dat uticaj upotrebe više konfekcijskih veličina sadržanih u krojne slike i vrste krojne slike na potrošnju tkanine.

Ključne reči: *tkanina, ženske pantalone, aranžman, ušteda.*

1. INTRODUCTION

The first technological process in making clothes is cutting. Cutting is separating of the garment into its components and in a general form, it is the production process of separating (sectioning, curving, severing) a spread into garment parts that are the precise size and shape of the pattern pieces on a marker.
In order to cut the clothes accurately and in the required sizes, it is necessary to make a suitable cut beforehand.
In addition to the importance of the cut, it is of great importance to make cuting layouts that contain the parts of the appropriate cut. The cuting layouts should be made so that the consumption of fabric will be minimized, but at the same time all the requirements and standards of both, the model and the fabric from which it is made will be achieved.
With the help of good organization and proper order, additional cost and loss will be avoided, and at the same time the process will be accelerated and the accuracy will be increased [1, 2].

1.1. Technological process of cutting

Cutting is the first technological operation in which the fabric is encountered. Cutting fabric is a process that is crucial to the four processes in the production of clothing, its accuracy and efficiency will directly affect the garment enterprise cost management and production efficiency.
In cutting section, quality can be controlled in two stages (fabric spreading and after cutting of fabric). Fabric spreading is laying out of the fabric in superimposed layers (plies) of specified length. Maintaining quality in fabric spreading is very important. Cutting quality plays an important role to make the best quality garments. The cutting section makes the raw shape of garments. If the quality of the cutting section is poor, the defects and rejects of the sewing section will high [3,4].
Operational preparation in the cutting process includes:

- Preparation of the basic cut with the cutting parts.
- Grading the cuting parts.
- Making cutting layouts.
- Making a plan for laying the fabric.
- Making a garment sizing cut plan according to a given order.

1.2. Cutting parts

Each cutting part should contain: mark or code, season, mark for the material, mark for the construction set, serial number of the cutting part, size number, markings for control measures, installation requirements [5].
The cutting part needs to be adjusted according to the dimensional stability and elastic properties of the material. Dimensional stability is assessed by:
Shortening after relaxation (irreversible process). Elongation after wetting (feedback process). The surface shortening can be calculated with the following expression:

$$p = So + Sv - \frac{SoSj}{100}$$

Where So is the shortening in the direction of the warp, and Sj is the shortening in the direction of the weft.

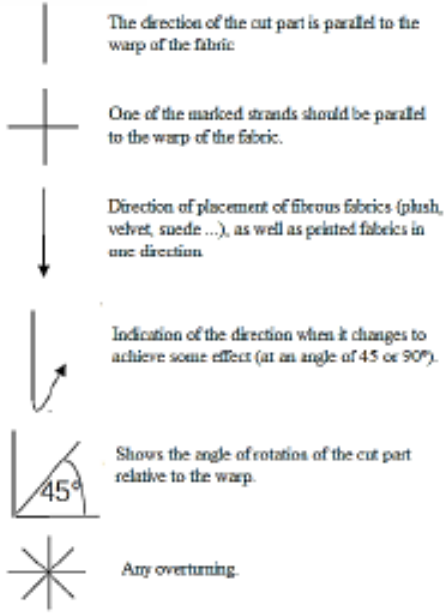

Figure 1: Commonly used marks in the cutting process

1.3. Grading

Grading is the process of creating a range of sizes for a single apparel style. The purpose of grading is to properly fit a pattern to a range of sizes. Grading will not create shape, but will only increase or decrease size of original shape. There are several types as follows:

- Linear increase and decrease.
- Interpolation method.
- Grading with a grade tables [6].

1.4. Optimization of the cutting layouts

Optimizing the cutting layouts depends from several factors:

- Optimal composition of the cutting layout.
- Optimize the cut with the given cutting layout to minimize the leftover in the rolls.
- Gradual laying of the cutting layers in the cutting layout.
- Optimize the laying of the cutting layers in multi-size cutting layouts.
- Optimization of the setting with the methods of optimization of all components.

The optimal composition of the cutting layouts is necessary to provide the maximum, while adjusting according to the structure of the cutting layouts, the width of the material, the type of model, and thus the way of laying.

So, for optimal use of the fabric in the rolls, it is necessary to sort and classify the rolls according to the length of the cutting layout. In the worst case, the rest of the fabric should be able to be used for further tailoring. However, there are limiting factors that hinder optimal utilization. They are:

- Material defects.
- Color differences between the rolls.
- Length of the material in the rolls (deviation from the declaration, etc.) [7,8].

2. EXPERIMENTAL

The model of women's pants that are subject to this analysis is shown below (Figure 2).

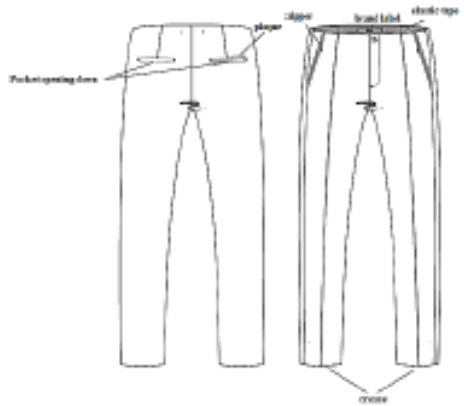

Figure 2: Sketch of the model 5293-00

This model of women's pants has two front and two rear pockets, two darts on the rear parts, crease, the zipper is standard and sewn on the front. The model has sloping belt (elastic inside). The model has inner label, plaque, and the belt is fastened with button.

Table 1: Size layout for the given model of women's pants

		34	36	38	40	42	44	46	VK
L1	28"	15	25	40	40	40	25	0	185
L2	30"	20	50	75	95	80	70	45	435
L3	32"	5	15	25	25	30	20	10	130
		40	**90**	**140**	**160**	**150**	**115**	**55**	***750***

Table 2: Main fabric (Number of cut pieces: 17. Useful fabric width: 132cm). 5x4,5526=22,763m

38L2	40L2	46L2	34L3
5	5	5	5

3. RESULT AND DISCUSSION

For the given model of women's pants, analysis of different variants for fitting the cutting parts in the cutting layout, using a software program was made. In the first part, an organization of the cutting parts is given (figure 1, 2, 3 ,4, 5 and 6). In the first mini bild of cutting layot the cutting parts have the best arrangement with the percent of utilization 83,53%, and the figure 6 shows lowest percent of utilization 82,92%. In the figures 2,3,4 and 5 a slight difference in the percentage of utilization is shown.

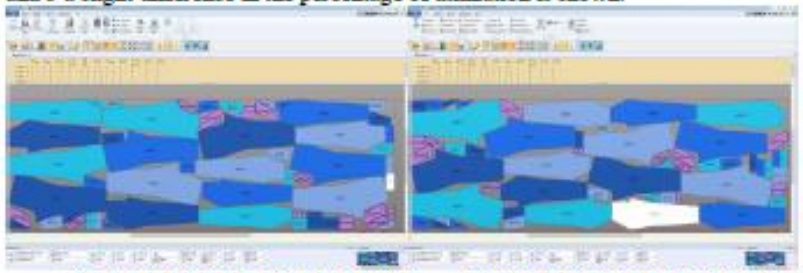

Figure 3: Mini bild of cutting layout 5293C384046L234L33C

Figure 4: Mini bild of cutting layout 5293C-38404244L2-3C

A_B=4,5526 m, A_N=3,8027 m; $I_{KS}=\frac{3,8027}{4,5526}$x100=83,53%

$A_{mag}=\frac{4,5526-3.8027}{4,5526}$ x100=16,47% ;70x4,6482 =325,374m

38L2	40L2	42L2	44L2
70	70	70	70

A_B=4,6482 m, A_N=3,8547 m; $I_{KS}=\frac{3,8547}{4,6482}$x100=82,93%

$A_{mag}=\frac{4,6482-3,8547}{4,6482}$ x100=17,07%; 50x4,6787=93,574

34L2	40L2	42L3	44L3
20	20	20	20

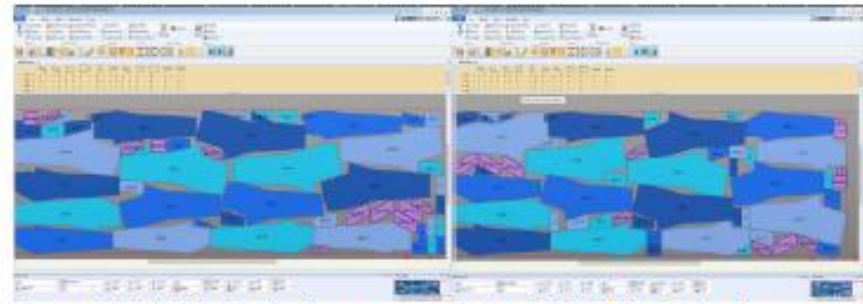

Figure 5: Mini bild of cutting layout 5293C3440L24244L33C

Figure 6: Mini bild of cutting layout 5293C3644L13840L33C

A_B=4,6787m, A_N=3,8814 m; $I_{KS}=\frac{3,8814}{4,6787}$x100=82,96%

$A_{mag}=\frac{4,6787-3,8814}{4,6787}$ x100=17,04% ; 25x4,5394=113,485m

36L1	44L1	38L3	40L3
25	25	25	25

A_B=4,5394 m, A_N=3,7640 m $I_{KS}=\frac{3,7640}{4,5394}$x100=82,92%

$A_{mag}=\frac{4,5394-3.7640}{4,5394}$ x100=17,08% ; 10X4,7698=47,698m

36L2	42L2	42L3	46L3
10	10	10	10

In the results below is shown the same work order with reorganized arrangement of the cutting parts, This research was made on purpose to determine whether the percent of utilization will vary more or less, and whether the percent of utilization will increase or decrease.

The obtained results showed that with the reorganization of the cutting parts, the percentage of utilization started to fall below 80%. Figure 7 shows higher percent of utilization (80.51%), compared with Figure 10 where the percent of utilizztion began to fall to (79.43%) and (78.93%) Figure 9, but the lowest percentage of utilization is noted in Figure 7 and the result is 78,69 %.

25x2,2659=56,6m

36L1	44L1
25	25

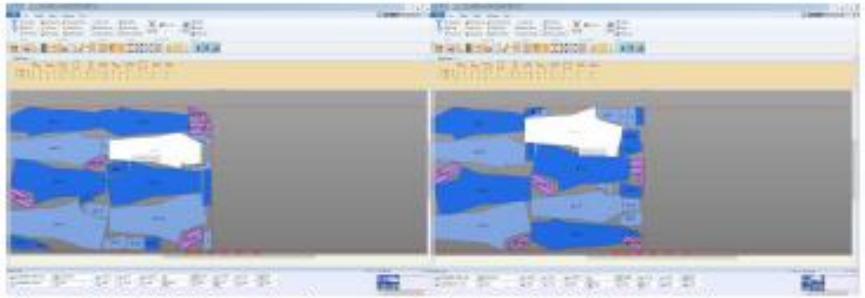

Figure 7: Mini bild of cutting layout 5293C-3644L1-3C

Figure 8: Mini bild of cutting layout 5293C-4042L1-3C

A_B=2,2659m, A_N=1,8242m ; $I_{KS}=\frac{1,8242}{2,2659}$x100=80,51%

$A_{meg}=\frac{2,2659-1,8242}{2,2659}$ x100=19,49%

40x2,3567=94,3m

40L1		42L1
40		40

A_B=2,3567 m, A_N=1,8547m; $I_{KS}=\frac{1,8547}{2,3567}$x100=78,69%

$A_{meg}=\frac{2,3567-1,8547}{2,3567}$ x100=21,31%; 45x2,4427=110m

36L2		46L2
45		45

Figure 9: Mini bild of cutting layout 5293C-3646L2-3C

Figure 10: Mini bild of cutting layout 5293C-3844L2-3C

A_B=2,4427m, A_N=1,9280 m; $I_{KS}=\frac{1,9280}{2,4427}$x100=78,93%

$A_{meg}=\frac{2,4427-1,9280}{2,4427}$ x100=21,07%; 70x2,4247=169,7m

38L2		44L2
70		70

A_B=2,4247m, A_N=1,9259m; $I_{KS}=\frac{1,9259}{2,4247}$x100=79,43%

$A_{meg}=\frac{2,4247-1,9259}{2,4247}$ x100=20,57%; 5x2,1885=10,9m

36L2		38L2
5		5

4. CONCLUSION

For the given model of women's pants, analysis of different variants for fitting the cut parts in the cutting layout, using a software program was made.

The consumption of the textile material and the cutting layout was shown that has strong connetction. The type of cutting layout can increase or decrease the consumption of textile material.

In the experimental part, the same order with two different cutting layouts were illustrated. In both cases it is made of the same fabric with the same width.

In the first case the fit of the cutting layout is with 4 and 5 sizes in one cutting layout, and in the second, cutting layoutis made with 1 and 2 sizes.

In the first case there is an average cost of 1,141 m per piece. With the reorganization of the cutting parts in the second the average cost was 1,180 m per piece. So, the difference between the average cost in both cases is evident. It has a lower value in the multi-size layout in a single layout, compared to the 1 and 2 size image layout. Or in numbers, it would be 29 m more used fabric from which another 25 pieces of pants could be sewn.

In the first part, an organization of the cutting parts is given (Figure 1, 2, 3 ,4, 5 and 6). In the first mini bild of cutting layot the cutting parts have the best arrangement with the percent of utilization 83,53%, and the Figure 6 shows lowest percent of utilization 82,92%. In the figures 2,3,4 and 5 a slight difference in the percentage of utilization is shown.

With the reorganization of the cutting parts, the percentage of utilization started to fall bellow 80%. Figure 7 shows higher percent of utilization (80.51%), compared with Figure 10 where the percent of utilization began to fall to (79.43%) and (78.93%) on Figure 9, but the lowest percentage of utilization is noted in Figure 7 and the result is 78,69 %.

Of course, since the main material for making clothes is one of the most expensive factors in the overall process, every meter of saved material is very important. That is why very often the cutting layout for the main fabric are long and with a small number of layers.
Loss of textile material can occur from a number of other, accompanying elements in the cutting process. That is why it is important to keep in mind the saving of textile material during the whole technological process.

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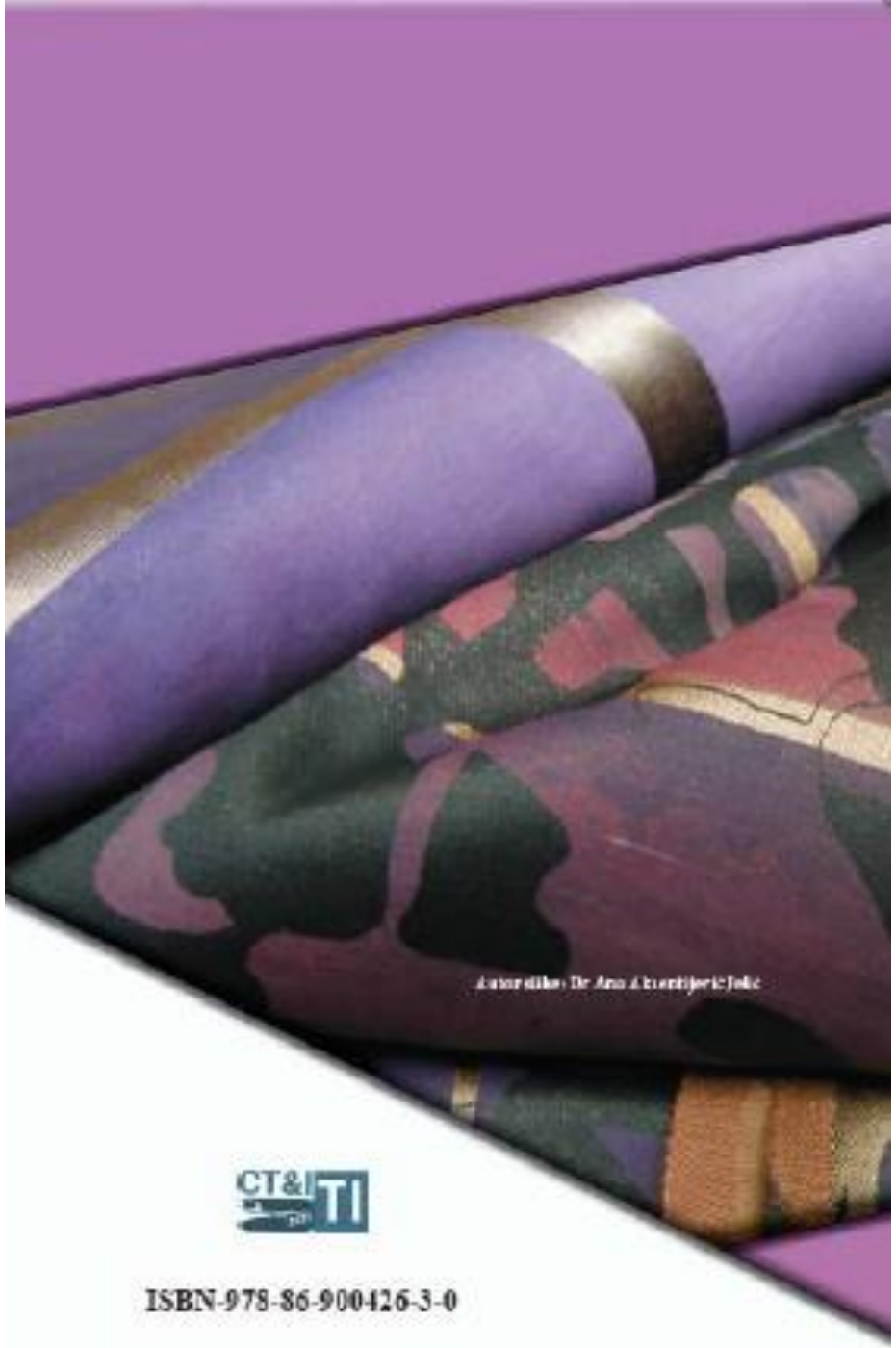

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