

Расчет нелинейных цепей.

ЗАДАЧА 15. Определить токи и напряжения всех участков цепи.

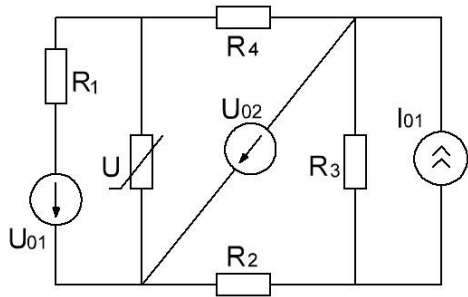
Заменить нелинейный элемент линейным для исследования цепи при небольших отклонениях от заданного режима. Нелинейный элемент симметричен  $U(-I) = -U(I)$  и имеет следующую вольтамперную характеристику:

|        |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |      |
|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
| $U, B$ | 0   | 30  | 45  | 54  | 56  | 55  | 51  | 48  | 46  | 45  | 45  | 46  | 50  | 60  | 73  | 90   |
| $I, A$ | 0,0 | 0,5 | 1,0 | 1,5 | 2,0 | 3,0 | 3,5 | 4,0 | 4,5 | 5,0 | 5,5 | 6,0 | 7,0 | 8,0 | 9,0 | 10,0 |

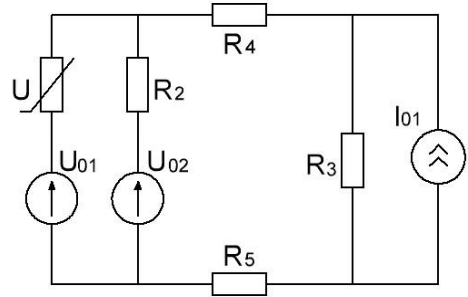
Величины напряжений, токов источников и сопротивления участков заданы в таблице вариантов.

Таблица вариантов

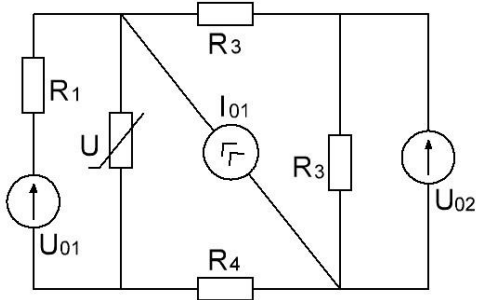
| Вариант | $U_{01}$ | $U_{02}$ | $U_{03}$ | $I_{01}$ | $I_{02}$ | $R_1$ | $R_2$ | $R_3$ | $R_4$ | $R_5$ |
|---------|----------|----------|----------|----------|----------|-------|-------|-------|-------|-------|
|         | $B$      | $B$      | $B$      | $A$      | $A$      | $Ом$  | $Ом$  | $Ом$  | $Ом$  | $Ом$  |
| 1       | 100      | 100      | -        | 10       | -        | 2     | 10    | 5     | 2     | -     |
| 2       | 120      | 20       | -        | 5        | -        |       | 3     | 4     | 1     | 1     |
| 3       | 100      | 50       | -        | 5        | -        | 4     | 25    | 10    | 2     | -     |
| 4       | 50       | 200      | 50       | -        | -        | -     | 5     | 20    | 10    | 10    |
| 5       | 70       | 200      | -        | 5        | -        | 6     | 10    | 10    | 10    | -     |
| 6       | 116      | 100      | 36       | -        | -        | -     | 12    | 36    | 12    | 8     |
| 7       | 200      | 50       | -        | 50       | -        | 10    | 1     | 20    | 1     | 10    |
| 8       | 100      | 100      | -        | 5        | -        | -     | 50    | 10    | 20    | 20    |
| 9       | 100      | 200      | -        | 10       | -        | 50    | 18    | 10    | 8     | -     |
| 10      | 100      | 200      | -        | 10       | -        | 20    | 10    | 5     | 5     | -     |
| 11      | 180      | 100      | 100      | -        | -        | 6     | 10    | 1     | 30    | 10    |
| 12      | 280      | -        | -        | 5        | 10       | 12    | 12    | 14    | 10    | -     |
| 13      | 100      | 180      | -        | 15       | -        | 1     | 24    | 4     | 12    | -     |
| 14      | 80       | 60       | 60       | -        | -        | 16    | 30    | 30    | 10    | 16    |
| 15      | 150      | 150      | 100      | -        | -        | 10    | 15    | 10    | 10    | 4     |
| 16      | 200      | 150      | -        | 10       | -        | 10    | 15    | 8     | 2     | -     |
| 17      | 200      | 35       | -        | 5        | -        | 20    | 3     | 20    | 5     | 20    |
| 18      | 300      | 100      | -        | 5        | -        | 24    | 20    | 12    | 20    | 50    |
| 19      | 200      | 60       | -        | 10       | -        | 20    | 6     | 10    | 5     | 30    |
| 20      | 100      | 200      | -        | 10       | -        | 10    | 10    | 10    | 5     | -     |
| 21      | 100      | 150      | -        | 5        | -        | 20    | 50    | 10    | 5     | 7     |
| 22      | 70       | -        | -        | 5        | 30       | 14    | 14    | 7     | 8     | -     |
| 23      | 20       | 120      | -        | 2,5      | -        | 4     | 8     | 4     | 40    | 15    |
| 24      | 50       | 50       | -        | 5        | -        | 20    | 25    | 5     | 20    | -     |
| 25      | 36       | 42       | -        | 2        | -        | 12    | 42    | 17    | 24    | -     |
| 26      | 120      | 108      | -        | 5        | -        | 20    | 20    | 5     | 8     | 12    |
| 27      | 60       | -        | -        | 8        | 5        | 15    | 4     | 20    | 20    | 10    |
| 28      | 65       | 50       | -        | 5        | -        | 15    | 10    | 10    | 8     | -     |
| 29      | 50       | 200      | -        | 10       | -        | 20    | 5     | 5     | 20    | -     |
| 30      | 100      | 150      | -        | 5        | -        | -     | 50    | 15    | 15    | -     |



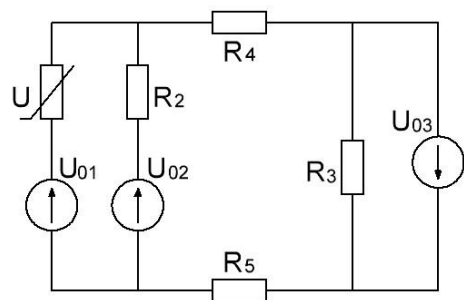
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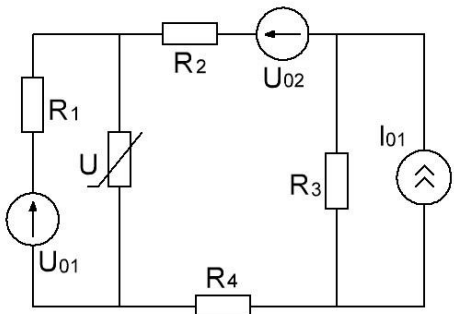
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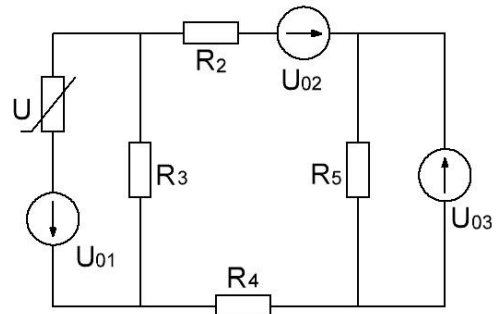
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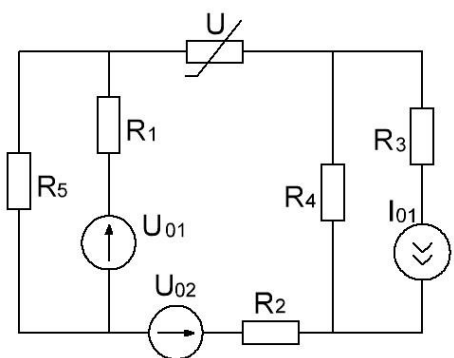
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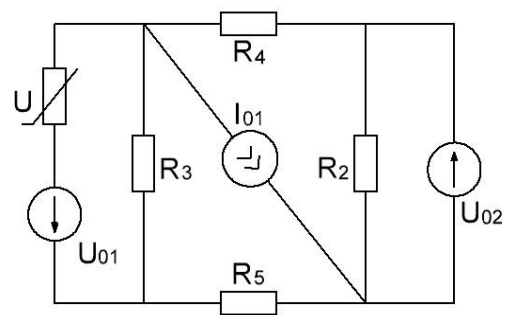
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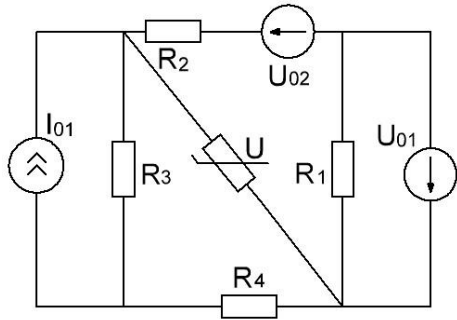


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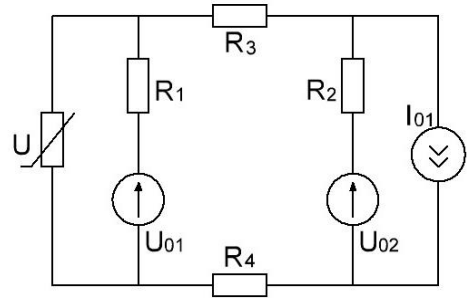


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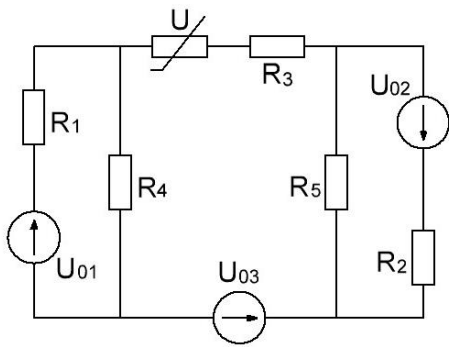
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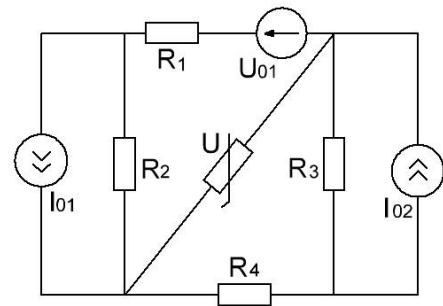
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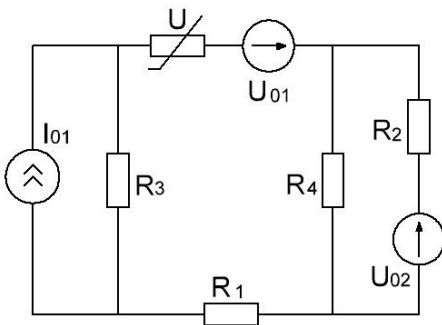
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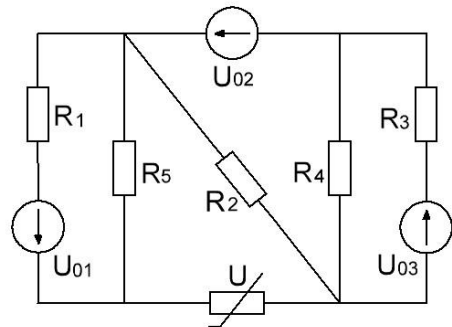
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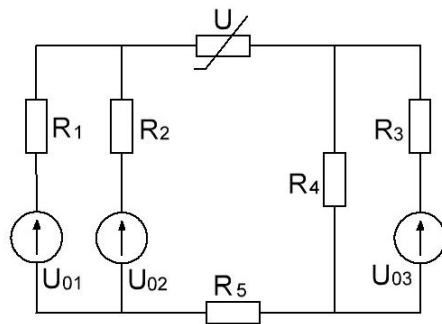
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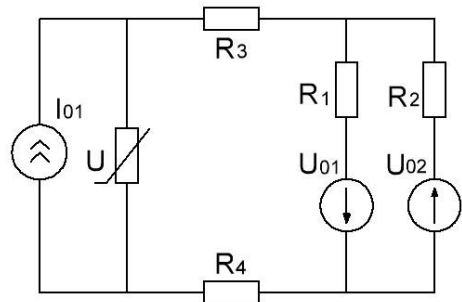
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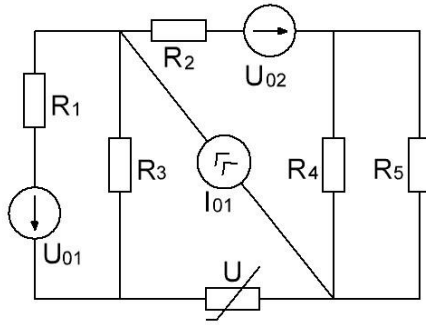


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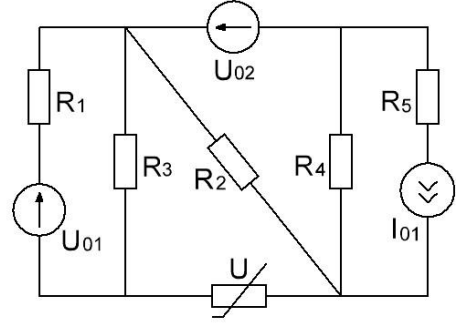


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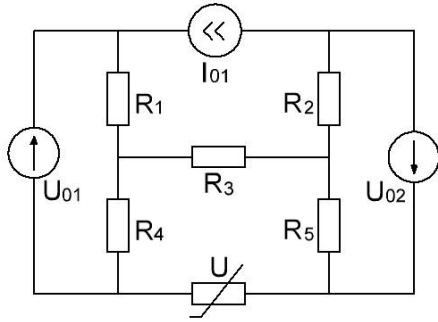




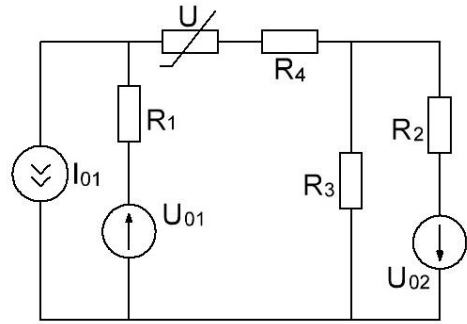
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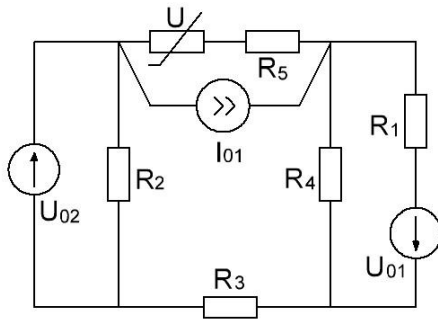
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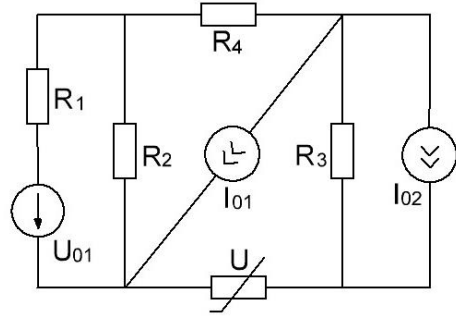
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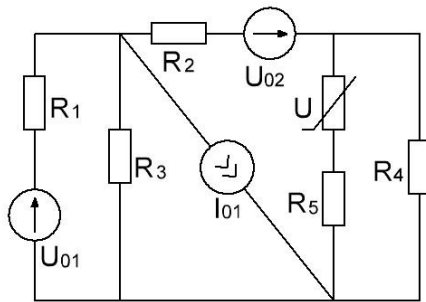
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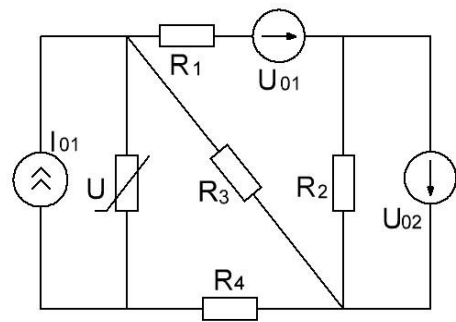
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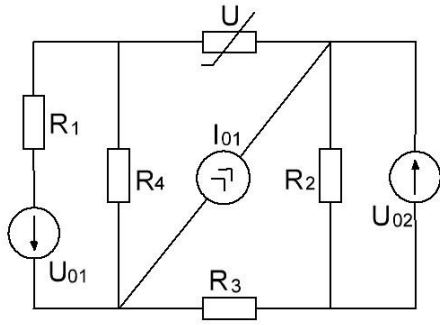
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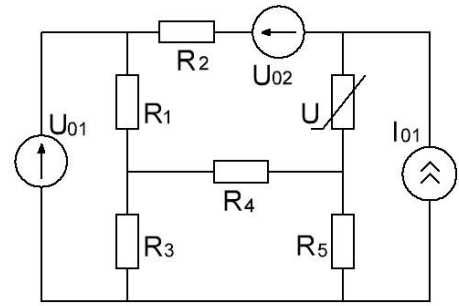
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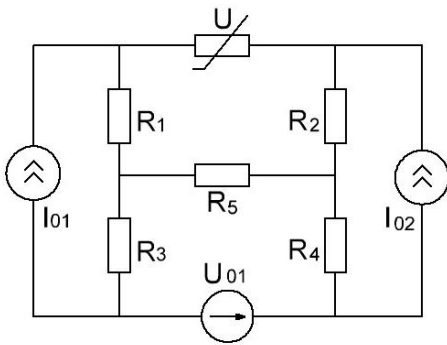
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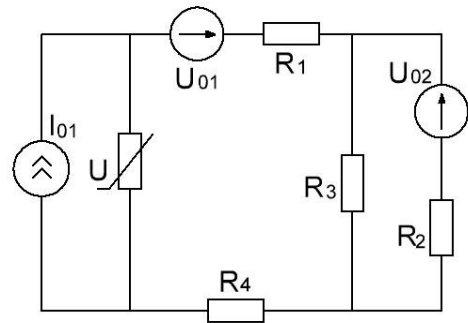
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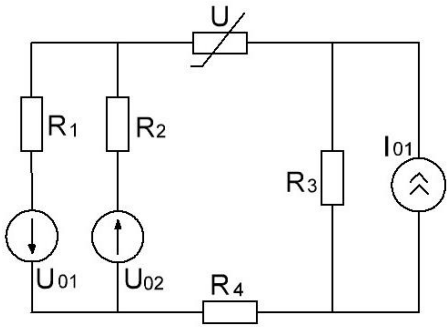
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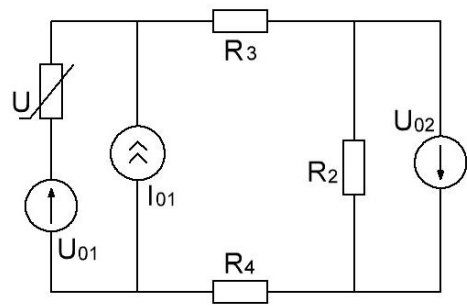
27.



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30.