POWER SYSTEM PLANNING

EXERCISE 1.2

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**GitHub Repository**

<https://github.com/rbuddhila95/PSPlab22_1120079_Ravindu.git>

**Selection of optimal voltage and current rating for an overhead line**

Assume

Take cross section values as 10, 16, 25, 35, 50, 70, 95, 120, 150, 185, 240, 300, 400, 500

Let’s find the optimal voltage values for each cross-section value and hence, the Annual cost each:

|  |  |  |
| --- | --- | --- |
| Cross-section | Optimal Voltage | Annual Cost |
| 10 | 21.24 | 925885.39 |
| 16 | 18.16 | 810951.28 |
| 25 | 15.65 | 727146.77 |
| 35 | 13.99 | 681425.82 |
| 50 | 12.42 | 651577.74 |
| 70 | 11.10 | 644240.18 |
| 95 | 10.02 | 659115.45 |
| 120 | 9.28 | 687566.82 |
| 150 | 8.61 | 731641.80 |
| 185 | 8.02 | 791223.99 |
| 240 | 7.36 | 895199.39 |
| 300 | 6.83 | 1017035.29 |
| 400 | 6.20 | 1230788.87 |
| 500 | 5.76 | 1452094.94 |

According to the mathematical calculation the minimum annual cost is for **70**  cable with **11.10 kV**

But the standardized voltage levels are, 11kV, 22kV and 33 kV

So, we can select **11kV voltage level** and **70 cross-section**

For that case,

**Optimum cost = 644279.22 €**

**ANNEX**

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