

Protection of Electrical Networks Against Transient Over-voltages Due to Electrical Lines Switching¹

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Abstract

This paper is an overview of one of the sources of various transient overvoltage in power systems, and the problems that may result. It analyzes the case of energizing a 230 kV overhead line and calculates the transient switching overvoltages that may occur. A mathematical model is developed for an overhead line represented as π and T quadric pole. An existing line 230 kV, 160 km was considered as study case. All the electrical parameters and characteristics were calculated. And so the mathematical model was used to simulate the transient switching overvoltages when the overhead line is energized.

Two methods were used for calculation. In the first method, all the physical parameters RLC of the elements of high voltage network – Generator, Transformer, Over-head line – were considered in the simulation model. In the second method it SIMULINK library was used to create the simulation model. The results were very interesting, the value of the voltage which appears at end of the line was $2.2 U_n$, about 505 kV for the line 230 kV.

¹ For the paper in Arabic see pages (173- 181).

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