

Relay protection optimization taking into account technical and economical parameters

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In this paper the importance of secondary circuits accounting at the Risk calculation is shown. Key Russian and foreign publications, which are connected with risk of relay protection outages, are considered. Attention was stressed on such groups of methods as: table-logical, logical-probabilistic, methods based on Markov chains and so on.

An algorithm of equipment's risks calculation in relay protection was proposed. Important to say, that method takes into account influence of both external and internal factors. The developed method uses the potential under-supply of electricity at the primary equipment element, due to the relay protection fault, as a risk indicator. Calculated risk depends not only on the short-range protection backup, but also on the long-range protection, power flow parameters and short circuit probabilities were taking into account as well.

Calculations, based on the developed algorithm, were carried out for the standard IEEE 14-node test scheme. The main dependencies were found, and after, main conclusions were made about the algorithm applicability.

Risk calculations in the under-supply units were completed additionally with the calculation of the cost of maintenance. At the end the final financial indicator was created, which allows to make some fundamental conclusions about service system efficiency.

Keywords: risk calculations, technical maintenance optimization, relay protection, equipment replacement programs.