Analysis on the Protective Coordination Problem in Power System with Superconducting Fault Current Limiter

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Introduction

demand



change of operation



Increase of short circuit

- high power quality
- increase demand

- large scale sourses
- interconnection
- loop power system

- change of breaker
- application of CLR

problem



Application of SFCL

- increase loss
- voltage drop

- lower loss
- high impedance
- reliability

(example of CLR application $: 40.3kA \Rightarrow 37.5kA)$

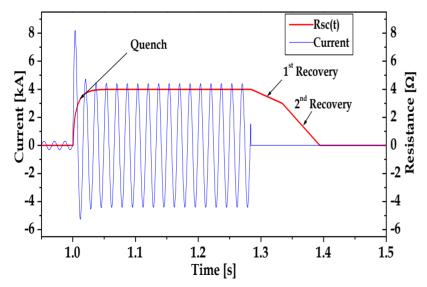




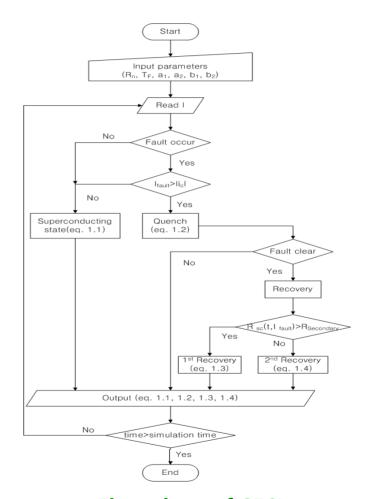
Modeling of SFCL

Characteristic equation

$$R_{sc}(t, I_{fault}) = \begin{cases} 0 & (t_{fault} > t) & (1.1) \\ R_{sc}(I_{fault}) \left[1 - \exp\left(-\frac{t - t_{fault}}{T_F(I_{fault})} \right) \right]^{\frac{1}{2}} & (t_{fault} \le t < t_{clear}) & (1.2) \\ a_1(t - t_{clear}) + b_1 & (t_{clear} \le t \le t_{2ndrecovery}) & (1.3) \\ a_2(t - t_{2ndrecovery}) + b_2 & (t_{2ndrecovery} \le t) & (1.4) \end{cases}$$



Result of Simulation using PSCA/EMTDC



Flow chart of SFCL