Simulation and Experimental Study of Arc Model in Low-Voltage Distribution Network-Variable Definition

Variable	Variable definition
g	Arc conductance
i	Arc current
ei	Input power per unit length arc
P_0	Combustion dissipation power per unit length arc
P_{loss}	Arc heat dissipation power
τ	Arc time constant
u	Arc voltage
e	Unit arc column electric field strength
R	Arc resistance
t	Integrating the time
α	Coefficient
β	Coefficient
I_0	Transition current
I_1	RMS value of the current (assuming I_1=10A)
dq/dt	Energy change rate stored per unit length arc
$x(1)$	State variable of the differential equation，The natural logarithm of arc conductance ln(g)
$x(0)$	Initial value of arc conductance ($x(0)$=ln($g(0)$))
$u(1)$	Arc voltage u, Corresponding to the first variable input of dee module
$u(2)$	Contact separation state quantity of circuit breaker, Corresponding to the second variable input of dee module
$u(3)$	Natural logarithm of arc conductance ln(g), Corresponding to the third variable input of dee module
S	Switching signal (0 or 1)
y	Represents the arc current i, Corresponding to the output variable of dee module.
g_0	Arc conductance constant
S_{t0}	Breaker separation start time
u_{ac}	AC supply voltage
G_C	Arc steady-state conductivity
τ_C	Arc time constant
U_C	Arc column steady-state field intensity coefficient
U_0	Voltage drop per unit length
L_C	Arc length
I_C	Peak arc current
g_0	Arc conductance constant
S_{t0}	Breaker separation start time