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3P78 - LUMPED PARAMETER MODEL AND ANALYSIS OF WIDE BAND RESISTANCE CAPACITANCE PARALLEL VOLTAGE DIVIDER FOR OVERVOLTAGE MONITORING

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Transient overvoltage of power equipment is an important factor affecting the reliability and stability of power systems. Accurate, fast and safe measurement of transient overvoltage is of great significance in the study of overvoltage and insulation design.
In order to monitor overvoltage, a lumped parameter model is established for the wide-band resistance capacitance parallel voltage divider in this paper., And the step response characteristics of the model are analyzed theoretically; the effects of ground stray capacitance, lead inductance and the value of the parallel resistance on measurement performance are simulated and analyzed.
The simulation results show that when the value of stray capacitance increases from 60pF to 140pF, the partial response time of the voltage divider rises from 11.4ns to 22.9ns. When the lead inductance changes from 2μH to 7μH, the response overshoot of the voltage divider is from 3.3% to 9.6%; when the value of the parallel resistance varies within the range of 400M to 1600M, the voltage divider has better linearity at low resistance. Therefore, under the condition of satisfying the insulation requirement, the appropriate reduction of the paralleled resistance and the ground stray parameters can improve the high frequency response characteristic of the wide band voltage divider, which provides a reference for practical engineering design.

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