Resistance switching

Resistive switching refers to the physical phenomena where a dielectric suddenly changes its (two terminal) resistance under the action of a strong electric field or current. The change of resistance is non-volatile and reversible. Typical resistive switching systems are capacitor like devices, where the electrode is an ordinary metal and the dielectric a transition metal oxide.

An interesting application of resistive switching is the fabrication of novel non volatile resistive random-access memories (RRAM). This effect is also at the base of the behavior of the so called memristor devices and neuromorphic memories. Resistive switching is the physical phenomenon that consists on the sudden and non-volatile change of the resistance due to the application of electric stress, typically voltage or current pulsing.

Capacitive current interruption, short line interruption,

Power systems contain lumped capacitors such as capacitor banks for voltage regulation or power factor improvement and capacitors that are part of filter banks to filter out higher harmonics. In addition, cable networks on the distribution level form a mainly capacitive load for the switching devices.

Capacitive switching requires special attention because, after current interruption, the capacitive load contains an electrical charge and can cause a dielectric re-ignition of the switching device. When this process repeats, the interruption of capacitive currents causes high over-voltages

Two cases must be considered when closing a capacitive circuit The first is illustrated in Figure 1, which shows a single-phase representation with lumped elements of capacitive circuit. Here the switch closes on a single bank whose circuit elements are the inductance of

the source *S L (resistance of the supply Rs @ 0), the local* inductance in the capacitor's cable *LC (LS >> LC) and the* capacitance *C of the bank. This is termed single bank or isolated bank switching.*

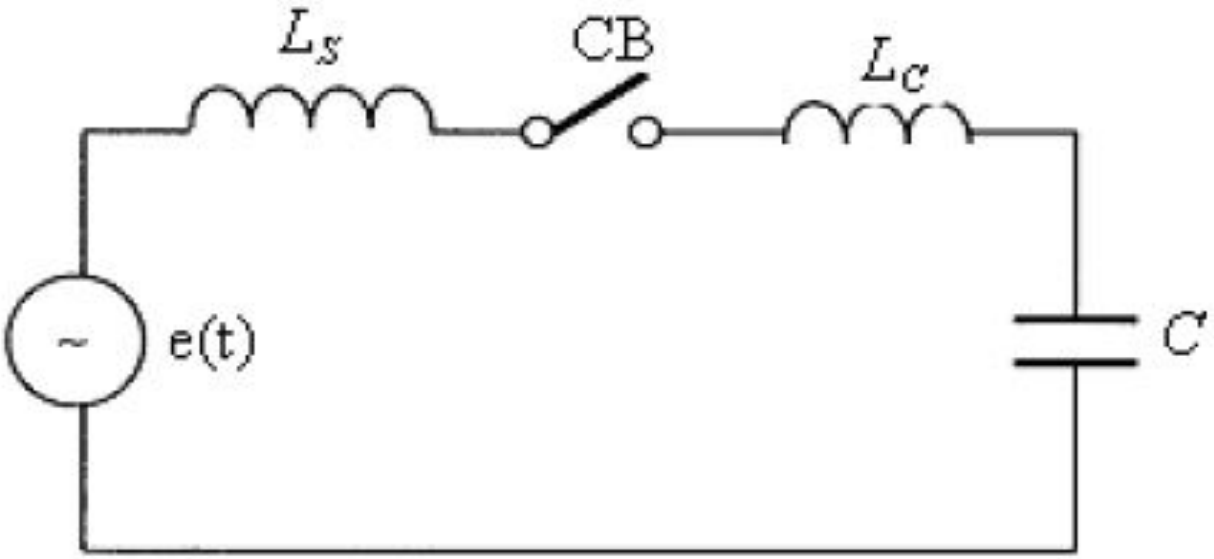

Fig. A single capacitor bank circuit