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Behaviour of an RC Circuit near Extreme Point

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Abstract : Charging and discharging of a capacitor through a resistor can be shown as exponential curve. Theoretically, it takes infinite time to fully charge or discharge a capacitor. The flow of charge is due to electrons having finite and fixed value of charge. If we carefully examine the charging and discharging process after several time constants, the points on q vs t graph become discrete and curve become discontinuous. Moreover for all practical purposes capacitor with charge (q0-e) can be taken as fully charged, as it introduces an error less than one part per million. Similar is the case for discharge of a capacitor, where the capacitor with the last electron (charge e) can be taken as fully discharged. With this, we can estimate the finite value of time for fully charging and discharging a capacitor.

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