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SWITCHING
REGULATOR
ANALYSIS

DC-DC Switching Regulator Analysis

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Figure 3.2 shows a simple PWM controller with a fixed-frequency fixed-amplitude sawtooth signal applied to the basic buck converter. The width of the PWM ON pulse is the time between the reset of the sawtooth generator and the intersection of the error voltage with the positive-going sawtooth signal, or ramp. If v_e is the error voltage amplitude, which is assumed to change slowly with respect to the switching frequency, and V_p is the sawtooth voltage amplitude, then the duty factor can be approximated by the continuous expression

$$d = \frac{v_e}{V_p} \quad (3.2)$$

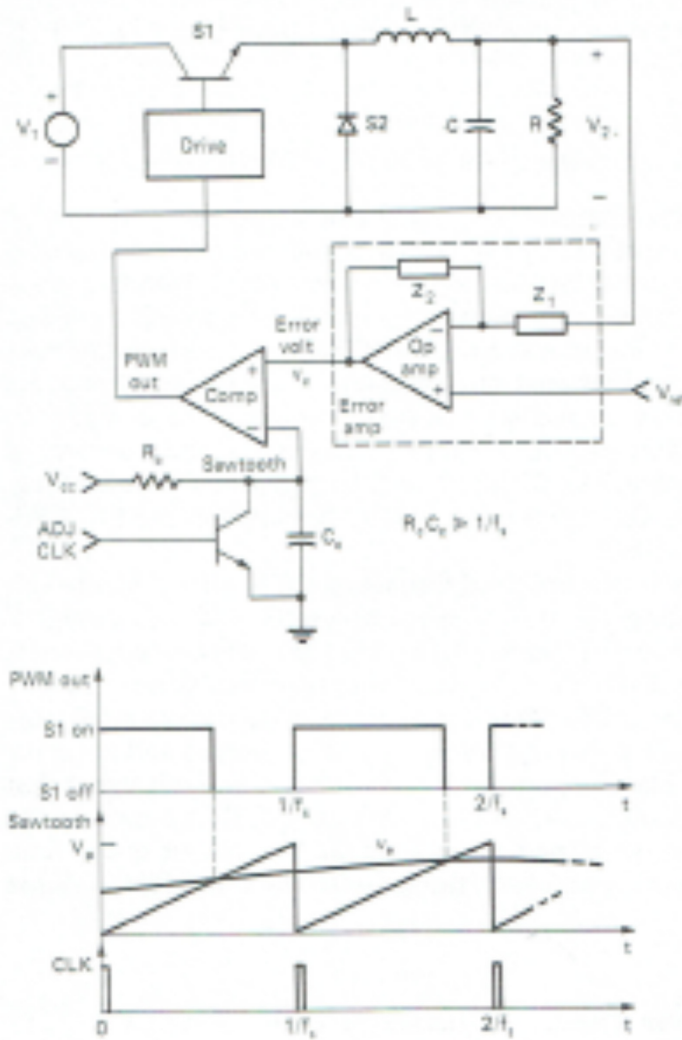


Figure 3.2 Simple fixed-frequency PWM controller.