

LOAD INFLUENCE IN THE EFFICIENCY OF A LOW VOLTAGE CAPACITIVE NONLINEAR TRANSMISSION LINE

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Abstract: Several works on Nonlinear transmission lines (NLTs) have demonstrated their suitability for application in communication systems, these applications involve techniques for forming and sharpening a short electrical pulse to achieve pulse compression, frequency multiplier, phase shifter, pulsed radar, battlefield communication disruption and also RF generation, holding a great potential for replacing vacuum electron tubes as a low cost and fully solid state technology. This paper addresses the influence of the load termination on the efficiency of a low voltage NLTL. The performance was assessed by simulation with the software LT-Spice. The efficiency of the capacitive NLTL was evaluated by the analysis of the signals in frequency domain by calculating the percentage ratio of output to input energy of the Fast Fourier Transform (FFT) input and output signals. The analysis of frequency domain signals shows that RF conversion efficiency is affected by the load termination. The increase of the load resistor value from 390 W to 50 kW caused the rise of the RF efficiency conversion from 4.4 to 19.3 %. For a reactive load the RF efficiency is maximized with a resistor of 1kW and an inductor of 6 mH reaching the value of 14.7 %.