RAT

1) NAME :

2) THE ELLIPTIC FILTER IS MONOTONIC IN THE PASSBAND.

3) THE BUTTERWORTH FILTER IS MONOTONIC IN THE STOPBAND.

4) THE BILINEAR TRANSFORMATION AVOIDS THE PROBLEM OF ALIASING

5) FOR THE BILINEAR TRANSFORMATION, THE MAPPING BETWEEN ω AND Ω IS NONLINEAR.

ECE 410

Practice Problems

10/27/05

Problem 1

Suppose we design a discrete-time filter using the impulse invariance technique with a CT lowpass filter as a prototype. The prototype filter has a cutoff frequency of $\Omega_c = 2\pi(1000)$ rad/sec and the impulse invariance transformation uses $T = 0.2$ ms. Assume that aliasing effects are negligible. What is the cutoff frequency ω_c of the resulting discrete-time filter?

Problem 2

We wish to design a discrete-time lowpass filter using the bilinear transformation on a continuous-time ideal lowpass filter. Assume that the continuous-time prototype has a cutoff frequency $\Omega_c = 2\pi(2000)$ rad/sec and we choose the bilinear transformation parameter $T = 0.4$ ms. What is the cutoff frequency ω_c of the resulting discrete-time filter?