THE UNIVERSITY OF TEXAS AT AUSTIN
Dept. of Electrical and Computer Engineering

*EE313 Linear Systems and Signals*
Problem Set #11: Forward and Inverse $Z$-Transforms

Prof. Brian L. Evans

Date assigned:  November 23, 2010
Date due:       December 2, 2010

*Homework is due at 11:00 am sharp in class. Late homework will not be accepted.*

Reading: *Signal and Systems*, Sections 11.1–11.5 and 12.1–12.7

You may use any computer program to help you solve these problems, check answers, etc.

As stated on the course descriptor, "Discussion of homework questions is encouraged. Please be absolutely sure to submit your own independent homework solution."

The office hours in ENS 433B for Prof. Evans follow.

- Tuesday 12:15pm–1:00pm (right after lecture)

- Wednesday 12:30pm–2:00pm

- Thursday 12:15pm–1:00pm (right after lecture)

- Friday 9:30am–11:00am

On Friday, December 3rd, Prof. Evans will not be available for his afternoon coffee hour. Prof. Evans can be reached at `bevans@ece.utexas.edu`.

The teaching assistant is Mr. Jackson Massey. His office hours will be on Wednesdays 4:00pm–7:00pm in ENS 138. Mr. Massey can be reached at `jackson.massey@gmail.com`.

The ECE Department is offering tutoring sessions for all basic sequence ECE courses, including EE 313, on Sundays through Thursdays, 7:00–10:00 pm, in ENS 314. Mr. Massey will be a tutor during the Monday and Wednesday evening sessions.

**Problem 11.1** *Z*-transform Properties
Roberts, Chapter 11, Problem 18.
Please express your answers using negative powers of $z$. Using negative powers is often more practical because every $z^{-1}$ corresponds to a delay by one sample, and hence, has a direct mapping to a causal implementation.

**Problem 11.2** Convolution

Roberts, Chapter 11, Problem 23.

Please express your answers using negative powers of $z$. Using negative powers is often more practical because every $z^{-1}$ corresponds to a delay by one sample, and hence, has a direct mapping to a causal implementation.

**Problem 11.3** Transfer Functions

Roberts, Chapter 12, Problem 24.

Also, compute the impulse response for each transfer function.

**Problem 11.4** Frequency Response

Roberts, Chapter 12, Problem 26.