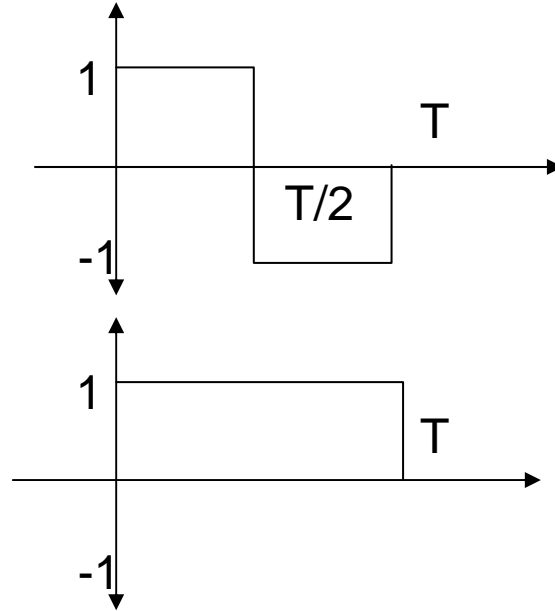


**EE 5654 - Digital Communications - Spring 2005**  
**Homework 2**  
**Due Thursday 2/10/05**

1. How do the decision regions for coherent BFSK change for unequal probabilities (0.9, 0.1) and an  $E_b/N_o = 5\text{dB}$ ? Use sigspace.m.
2. Assume that binary data is transmitted via two waveforms:



- (a) Determine basis functions for this signal set.
  - (b) What is the dimensionality of the signal set?
  - (c) Draw the reduced complexity optimal receiver.
  - (d) Draw the resulting constellation diagram.
  - (e) Draw the decision boundaries assuming that  $p_1 = p_2$ .
  - (f) Determine the probability of error.
3. Show that the ML receiver is equivalent to a receiver which maps received signals to the closest signal point.
  4. Problem 5-5 in the text book.
  5. Problem 5-6 in the text book.