

Middle East Technical University  
Department of Electrical and Electronics Engineering

**EE 531 – HW #2**

Due: Nov. 10, 2014 (in-class)

1. Let  $\Omega = \{a, b, c, d\}$ . Assume that  $P(\{a\}) = P(\{b\}) = 0.3$ ,  $P(\{c\}) = 0.4$  and  $P(\{d\}) = 0$ . The sequence of random variables  $X_n(\omega)$   $n=1, 2, \dots$  is defined as follows:

$$X_n(\omega) = \begin{cases} X_n(a) & = 1 + (1/2)^n \\ X_n(b) & = \frac{n-1}{n+1} \\ X_n(c) & = 1 \\ X_n(d) & = (-1)^n \end{cases}$$

Is this random sequence convergent in any sense? (convergence possibilities are in probability, almost surely, MS convergence, in distribution.) Explain your reasoning clearly.

Answer the same question if the probability assignment is changed to  $P(\{a\}) = P(\{b\}) = 0.3$ ,  $P(\{c\}) = 0.3$  and  $P(\{d\}) = 0.1$ .

2. (From textbook)

- a) Exercise 1.11
- b) Exercise 1.20

- c) Exercise 1.40
- c) Exercise 1.47