COMMUNICATION SYSTEMS

HOMEWORK # 2:

Please work out the **ten** (10) problems stated below – LD refers to the text: B,P. Lathi and Z. Ding, *Modern Digital and Analog Communication Systems* (Fourth Edition), Oxford University Press, Oxford (UK), 2009. Exercise **2.1-1** (LD) refers to Exercise 1 for Section 2.1 of LD.

Show work and **explain** reasoning. Three (3) problems, selected at random amongst these ten problems, will be marked.

1.

Problem **3.1-1** (LD).

2.

Problem **3.1-2** (LD).

3.

Problems **3.1-4** (LD).

4.

Problems **3.1-5** (LD).

5.

Problems **3.1-6** (LD).

6.

Problems **3.1-7** (LD).

7.

Problems **3.3-2** (LD).

8.

Problems **3.3-3** (LD): Do the calculations in two different ways: (i) As requested in the textbook and (ii) By direct calculations!

9.

Problems **3.4-1** (LD):

10.

Consider a periodic signal $g : \mathbb{R} \to \mathbb{C}$ with period $T > 0$, i.e.,

$$g(t + T) = g(t), \quad t \in \mathbb{R}.$$

Assume that

$$\int_0^T |g(t)| dt < \infty.$$

Show that the Fourier coefficients of g can be computed as

$$c_n = \frac{1}{T} \int_a^{a+T} g(t) e^{-j2\pi \frac{n}{T} t} dt, \quad n = 0, \pm 1, \pm 2, \ldots$$

regardless of the value of a in $\mathbb{R}$.