

Homework #4

Instructor: Dr. Zafeirakis Zafeirakopoulos
Assistant: Gizem Süngü, Başak Karakaş

Name:

Student Id:

Course Policy: Read all the instructions below carefully before you start working on the assignment, and before you make a submission.

- It is not a group homework. Do not share your answers to anyone in any circumstance. Any cheating means at least -100 for both sides.
- Do not take any information from Internet.
- No late homework will be accepted.
- For any questions about the homework, send an email to gizemsungu@gtu.edu.tr
- Submit your homework into Assignments/Homework4 directory of the CoCalc project CSE211-2019-2020.

Problem 1: Nonhomogeneous Linear Recurrence Relations

(15+15=30 points)

Consider the nonhomogeneous linear recurrence relation $a_n = 3a_{n-1} + 2^n$.

(a) Show that whether $a_n = -2^{n+1}$ is a solution of the given recurrence relation or not. Show your work step by step.

(Solution)

(b) Find the solution with $a_0 = 1$.

(Solution)

Problem 2: Linear Recurrence Relations

(35 points)

Find all solutions of the recurrence relation $a_n = 7a_{n-1} - 16a_{n-2} + 12a_{n-3} + n4^n$ with $a_0 = -2$, $a_1 = 0$, and $a_2 = 5$.

(Solution)

Problem 3: Linear Homogeneous Recurrence Relations

(20+15 = 35 points)

Consider the linear homogeneous recurrence relation $a_n = 2a_{n-1} - 2a_{n-2}$.

(a) Find the characteristic roots of the recurrence relation.

(Solution)

(b) Find the solution of the recurrence relation with $a_0 = 1$ and $a_1 = 2$.

(Solution)