Ruslans Babajans, 171REB152

**Task 6**

1. The distortion in the signal is a carrier phase difference, i.e., it is defined in the form:



where  is the original generated symbol,  is a time-varying phase. Your task is to develop a dynamic system that compensates this distortion. Use x[n] as an input of the dynamic system. Denote

an output of this system by y[n] and the current value of the recovered phase by φ[n].

• Define a correction application in the from y[n] = f(x[n], φ[n−1]).



• Define a cost function J[n]. Assume you precisely know the value of the original symbol (you can use ≡  in this expression).

Hint: minimize square of the difference.



Or



• Use the stochastic gradient approach to express the increment of the φ[n] on the next clock cycle.



• Draw block diagram of this dynamic system.

