Assignment - 2

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***Abstract*—This document contains the solution to Exercise 3.30(b) of Oppenheim.**

Problem 1. Determine the inverse $z-$transform of

$$X(z) = log_2(\frac{1}{2} - z), \quad |z| < \frac{1}{2} \tag{1}$$

(b) by using the power series
Solution: For the ROC $|z| < \frac{1}{2}$

$$nx[n] \leftrightarrow -z\frac{d}{dx}log(1-2x) = -z(\frac{1}{1-2z})(-2) = z^{-1}(\frac{-1}{1-\frac{1}{2}z^{-1}}) \tag{2}$$

$$nx[n] = (\frac{1}{2})^n u[-n-1] \tag{3}$$

$$x[n] = \frac{1}{n}(\frac{1}{2})^n u[-n-1] \tag{4}$$