Energy Consumption Improvement of OOK Transmitter Based on Minimum Energy Coding

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Manuscript

Keywords: Wireless sensor networks, Energy effciency, OOK, Minimum energy coding

Posted Date: February 9th, 2021

DOI: https://doi.org/10.21203/rs.3.rs-192993/v1

Version of Record: A version of this preprint was published at Wireless Personal Communications on August 22nd, 2021. See the published version at https://doi.org/10.1007/s11277-021-08989-w.

Abstract

Energy consumption of Wireless Sensor Networks (WSNs) including OOK transmitter is important for short range transmission and long battery life time requirements. In this paper, the Minimum Energy (ME) coding strategy is adopted to improve the energy efficiency of an OOK transmitter. We first give the energy consumption model based on a real OOK transmitter, which can completely switch off the transmitter during the transmission of low bit '0' and has an energy effciency of 52 pJ/bit. Based on this energy consumption model, ME-Coding provides an energy effciency of 30 pJ/bit for coding size k = 3. Moreover, larger coding size others more significant improvement, at the sacrifice of spectral effciency and transmission range. In this paper, we have also determined a closed-form solution for the optimal coding size for a given transmission range constraint.

Full Text

Due to technical limitations, full-text HTML conversion of this manuscript could not be completed. However, the manuscript can be downloaded and accessed as a PDF.

Figures

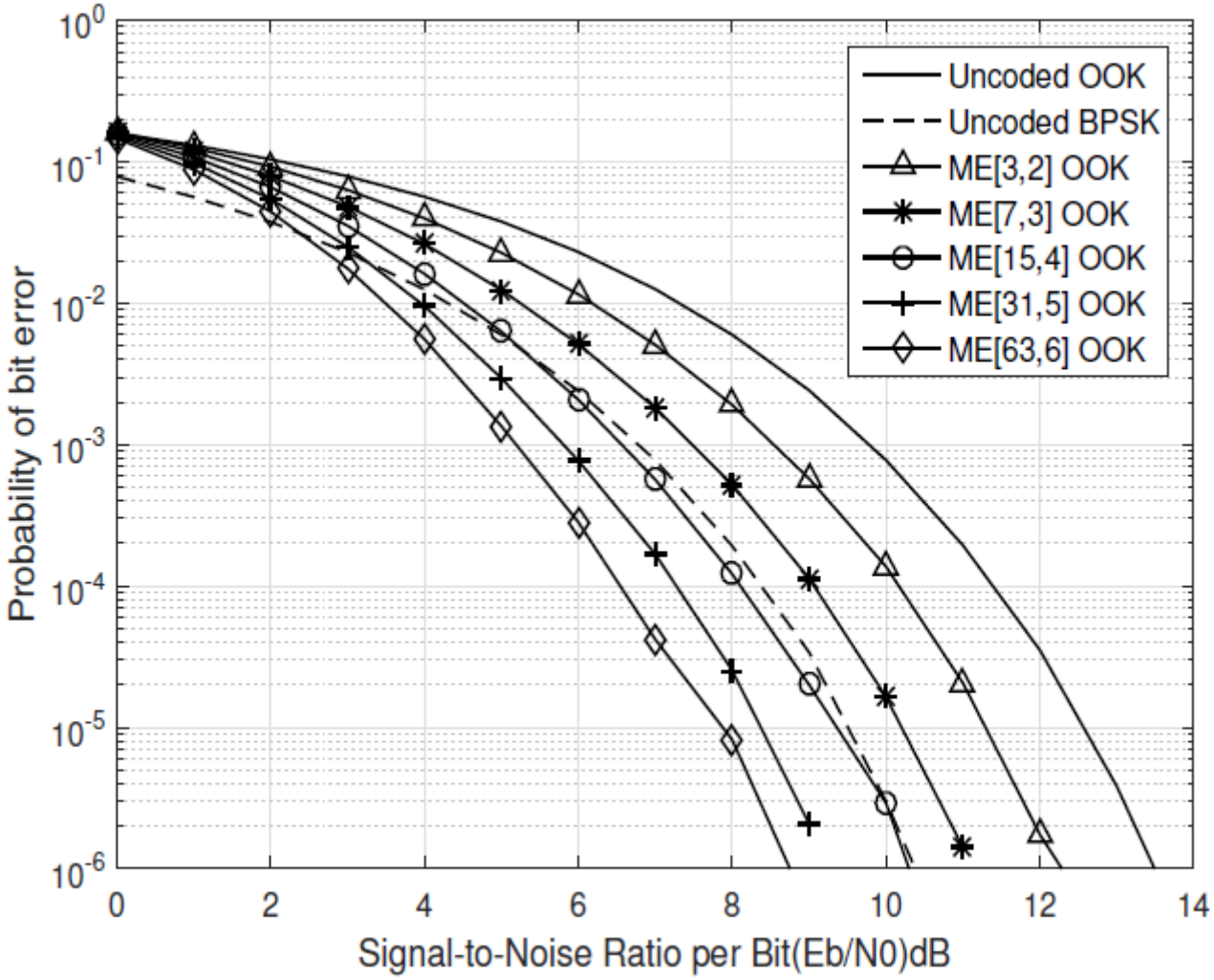

Figure 1

BER performance of ME-Coding

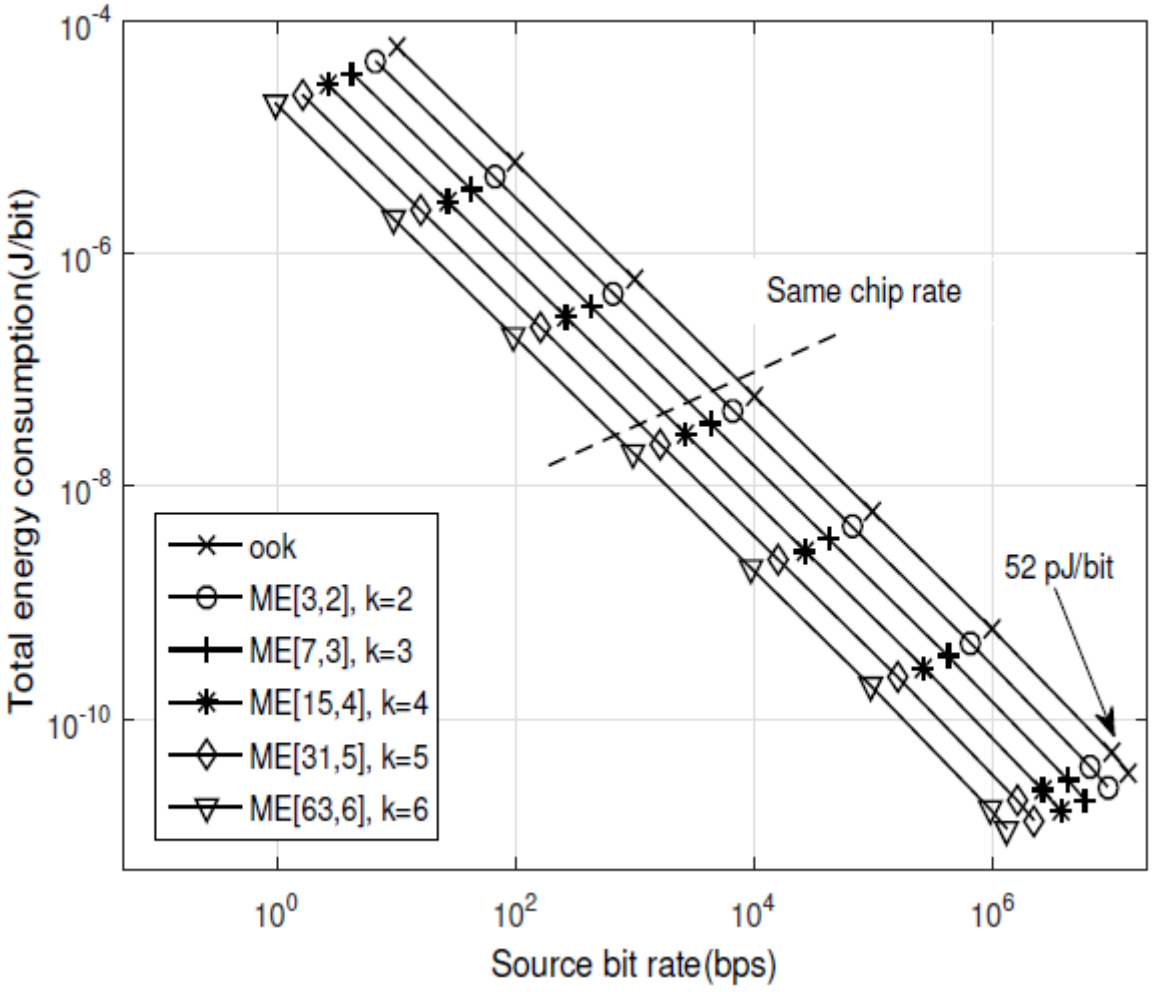

Figure 2

Total energy consumption per source bit

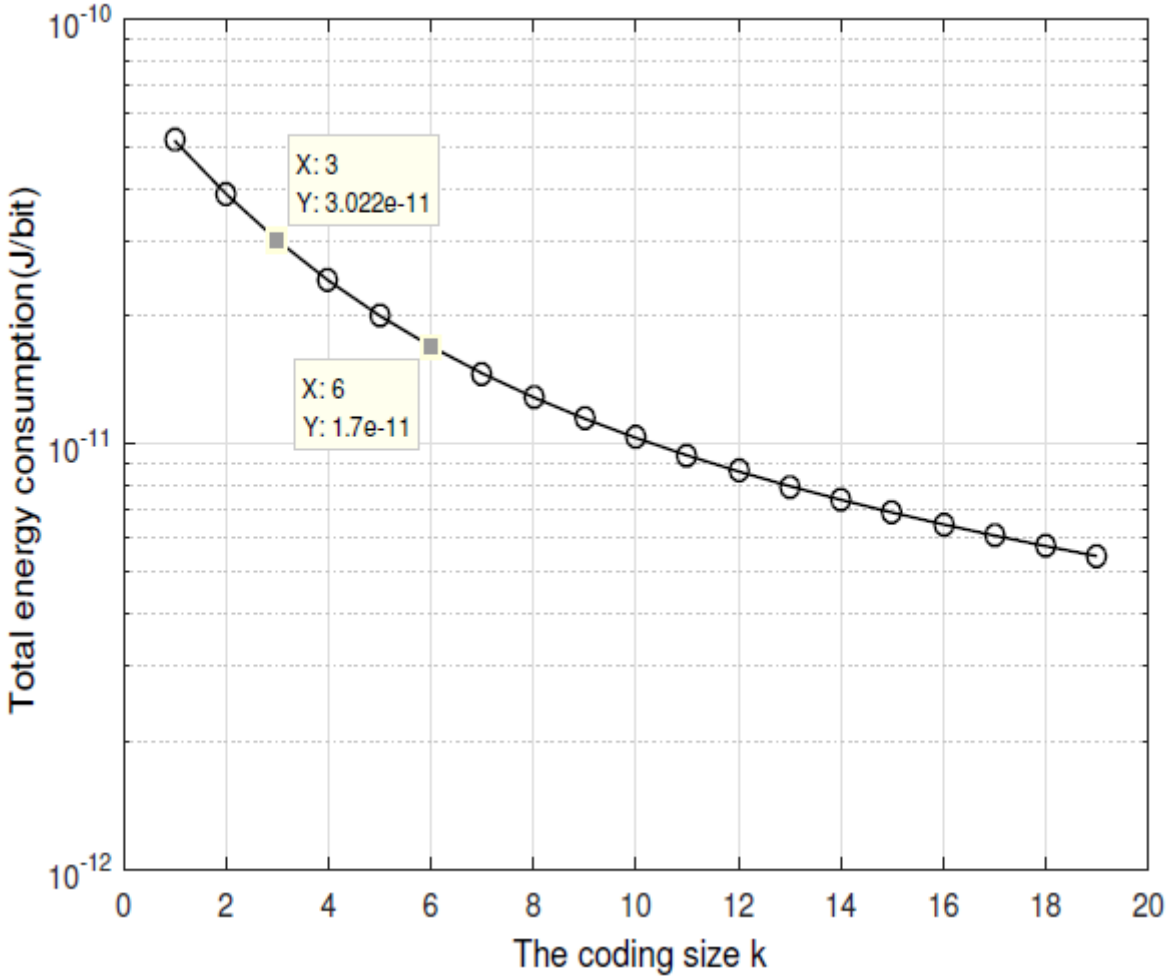

Figure 3

Total energy consumption as function of k

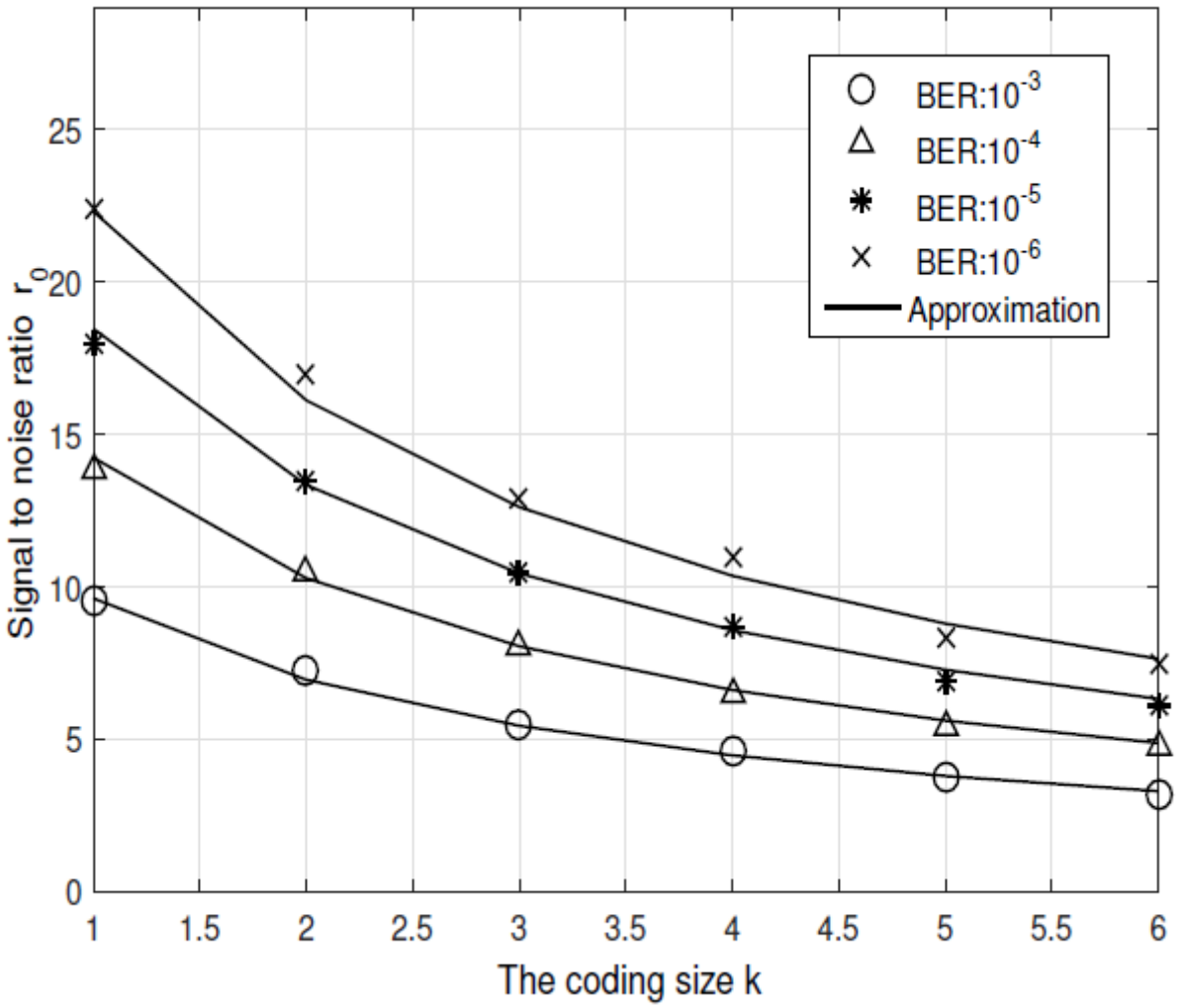

Figure 4

Signal to noise ratio r0 versus coding size k

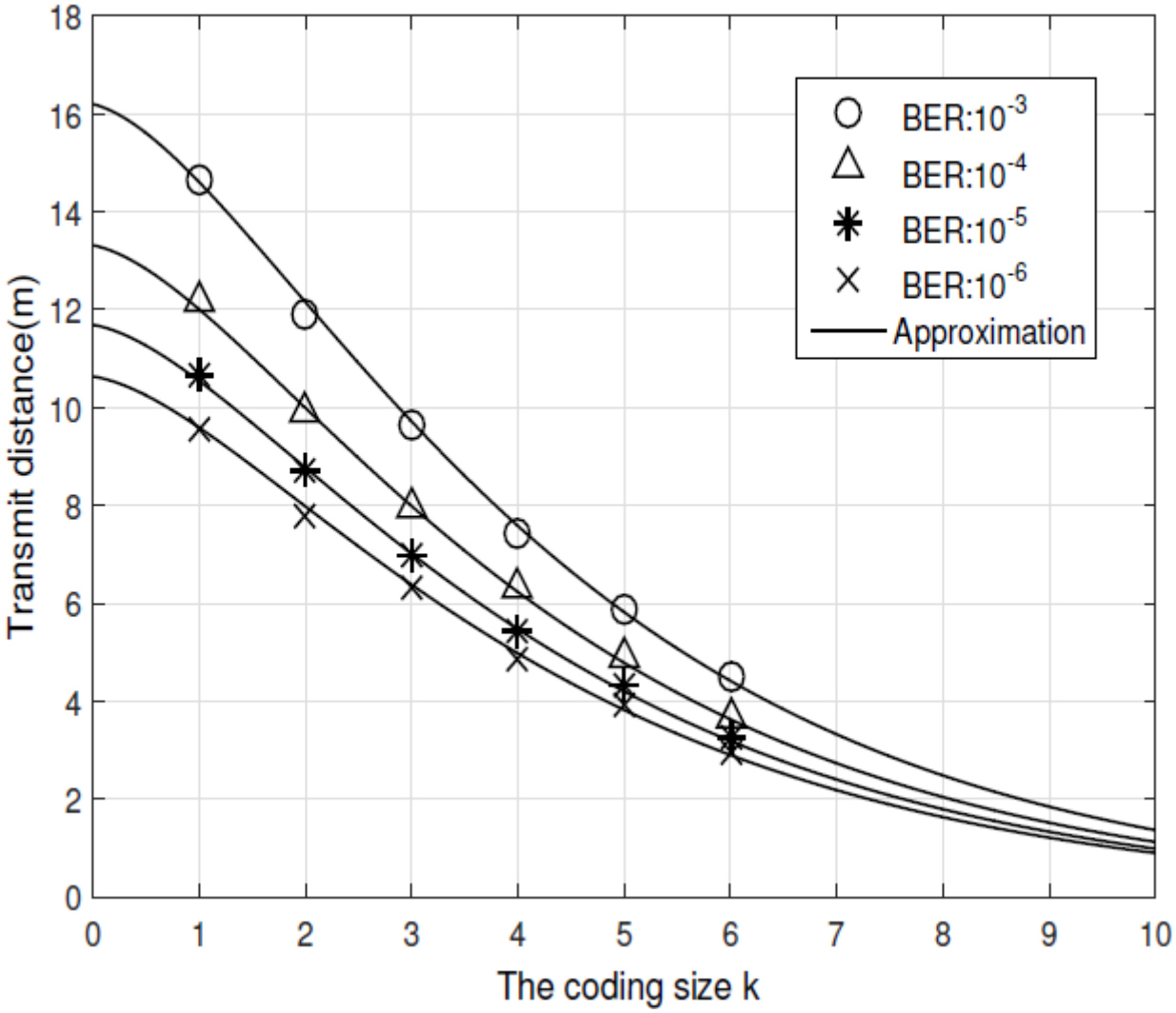

Figure 5

Transmission range versus coding size k

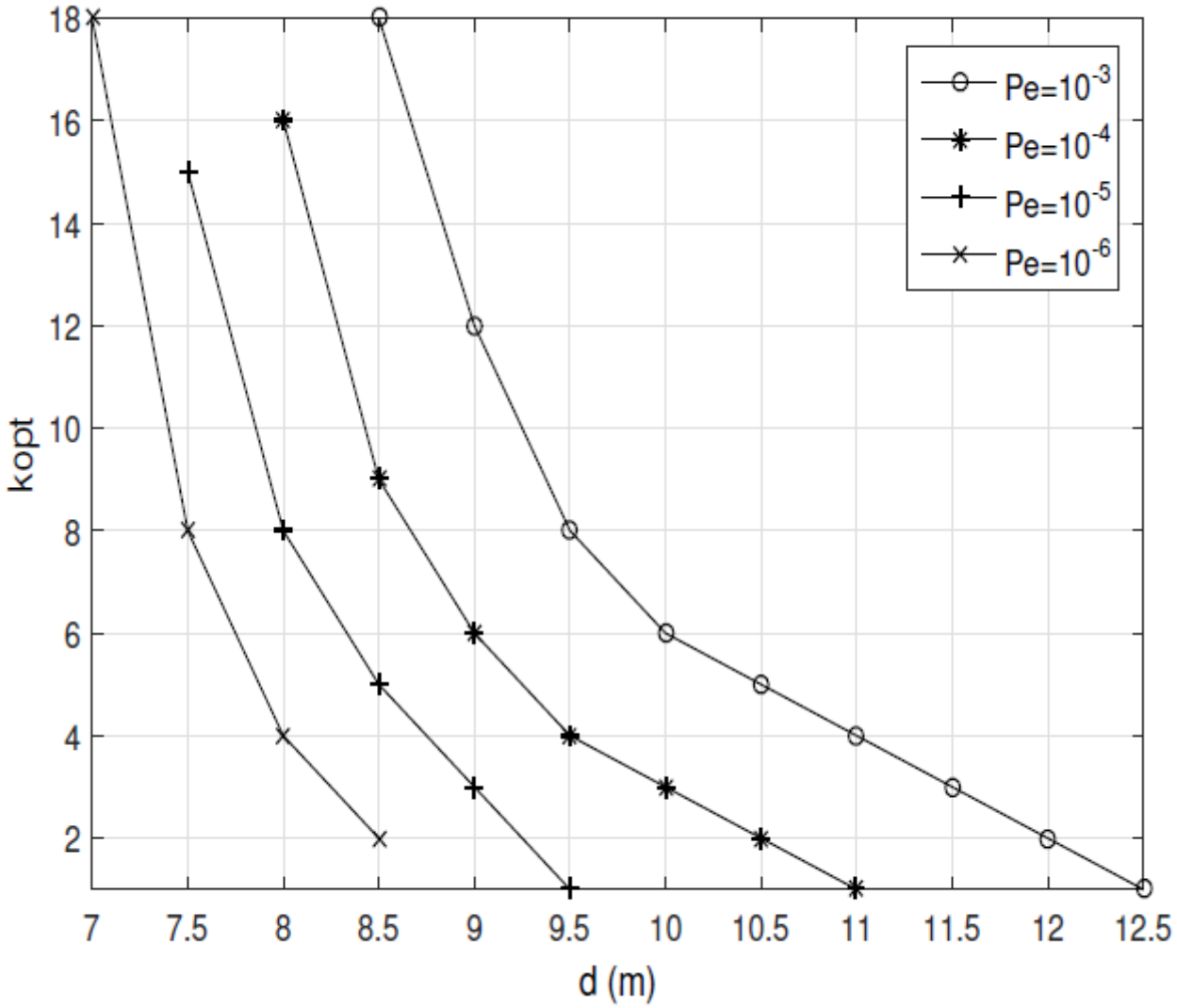

Figure 6

Optimal k versus transmission range

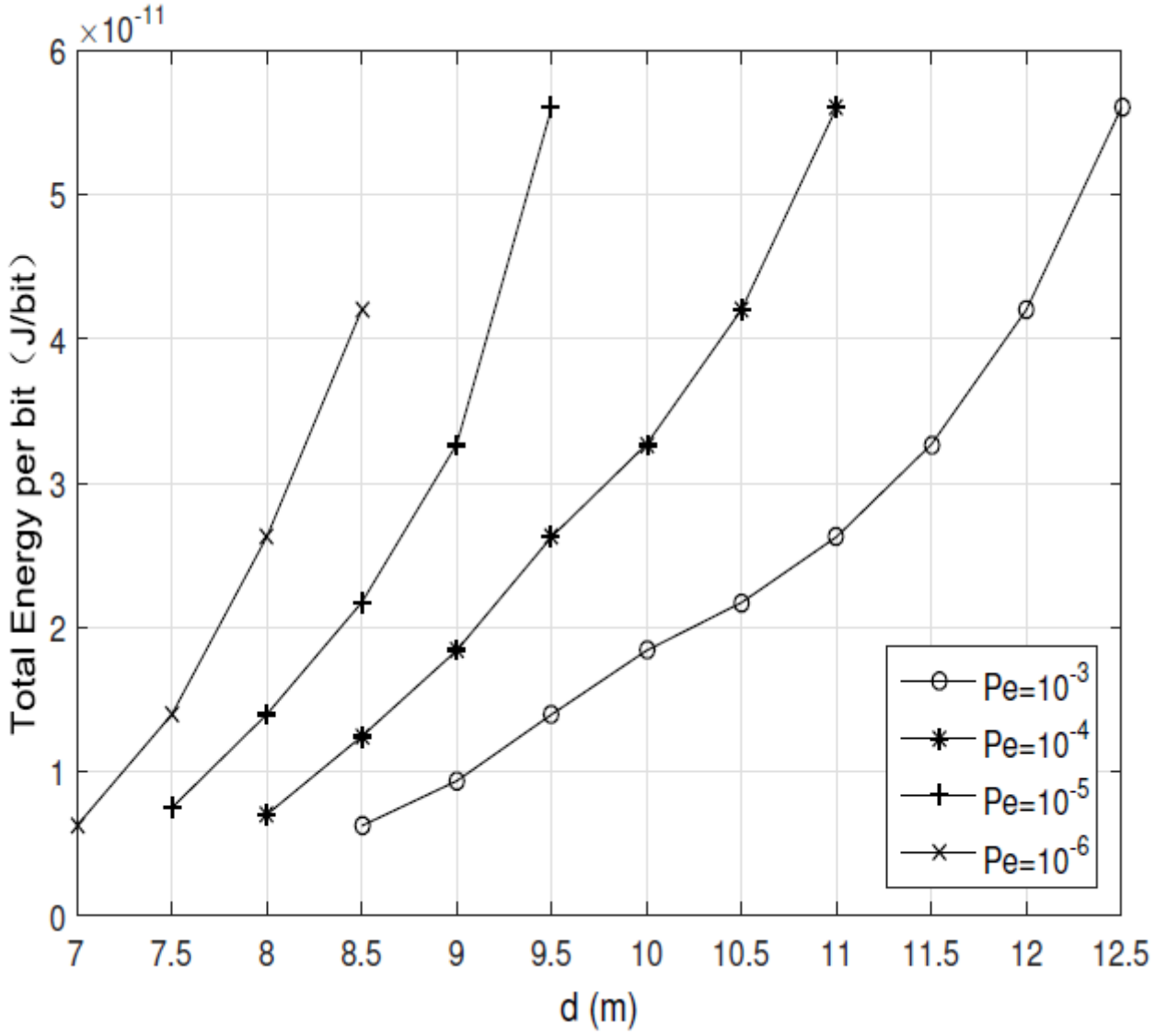

Figure 7

Optimal energy per bit versus transmission range

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- PENGYUEWPC.rar