Accepted Manuscript

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PII: S0377-0427(18)30462-X
DOI: https://doi.org/10.1016/j.cam.2018.07.036
Reference: CAM 11822

To appear in: *Journal of Computational and Applied Mathematics*

Received date : 6 April 2018
Revised date : 16 June 2018

Please cite this article as: S. Eryilmaz, $(k_1, k_2, \ldots, k_m)$-out-of-n system and its reliability, *Journal of Computational and Applied Mathematics* (2018), https://doi.org/10.1016/j.cam.2018.07.036

$(k_1, k_2, ..., k_m)$-out-of-n system and its reliability

by

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Abstract

This paper is concerned with a system consisting of multiple types of components and having $(k_1, k_2, ..., k_m)$-out-of-n structure. The $(k_1, k_2, ..., k_m)$-out-of-n system is a system consisting of n_i components of type i, $i = 1, 2, ..., m$, and functions if at least k_1 components of type 1, k_2 components of type 2, ..., k_m components of type m work, $n = \sum_{i=1}^{n} n_i$. The exact and approximate expressions are obtained for the survival function of the system under concern. The weighted-$(k_1, k_2, ..., k_m)$-out-of-n system is also defined and studied. This weighted model is applied to evaluate the wind power system that consists of two wind plants.

Keywords. Dependence; k-out-of-n system; Reliability approximation; Wind power system

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