

On the Performance of Autoencoder-Based Space Optical Communications

Abd El-Rahman A. El-Fikky and Zouheir Rezki

Department of Electrical and Computer Engineering

University of California Santa Cruz

Santa Cruz, California, USA

{afikky, zrezki}@ucsc.edu

Abstract—In this paper, we propose a deep learning autoencoder (AE) to model and design space optical communications (SOC) systems from end-to-end performance. The proposed AE is based on multiple-decoders and a new layered structure for constructing both encoders and decoders. The use of multiple-decoders can increase the receiver diversity, which allows the gradient descent to minimize the cost function compared to

proportional to the light intensity and governed by a non-negativity constraints. When a photo-detector detects the light, it generates a signal that is proportional to the intensity of the light received and contaminated by noise [3], [4].

RF channel is well-understood as it is a mature research topic and related research has been ongoing for more than