**Variable weight Khazani-Syed code using hybrid fixed-dynamic technique for optical code division multiple access system**

## ABSTRACT

Future Internet consists of a wide spectrum of applications with different bit rates and quality of service (QoS) requirements. Prioritizing the services is essential to ensure that the delivery of information is at its best. Existing technologies have demonstrated how service differentiation techniques can be implemented in optical networks using data link and network layer operations. However, a physical layer approach can further improve system performance at a prescribed received signal quality by applying control at the bit level. This paper proposes a coding algorithm to support optical domain service differentiation using spectral amplitude coding techniques within an optical code division multiple access (OCDMA) scenario. A particular user or service has a varying weight applied to obtain the desired signal quality. The properties of the new code are compared with other OCDMA codes proposed for service differentiation. In addition, a mathematical model is developed for performance evaluation of the proposed code using two different detection techniques, namely direct decoding and complementary subtraction.