Signal-Space Coding for the Collision Channel: Collision Resistant Modulation

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In this talk we propose a new class of signal-space codes combined with time-frequency hopping for wireless mobile communication. These schemes are designed to operate over a Multiple Access Channel with slotted random access protocols, where transmission is impaired by collisions, fading and additive noise. Examples of construction of such signal sets are provided and numerical results, based on closed-form error probability analysis show that our schemes achieve a significant reduction of the information loss probability with respect to standard modulation formats. Unlike standard forward error correcting codes, our schemes do not reduce the spectral efficiency of transmission.

Keywords: Signal-space codes, multiple-access channels, slotted ALOHA, wireless communications.

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