Iterative Non-coherent Detection of Serial Concatenated Codes with Differential Modulation

Author(s) - Institution(s):
Kai Zhu, UOY
Alister Burr, UOY

Corresponding author email: alister.burr@york.ac.uk

Corresponding WG group:
WG2

Abstract:
In this contribution, we investigate the properties of serially-concatenated coding (SCC) schemes with differential PSK modulation. The differential encoder (DE), which can be interpreted as a recursive non-systematic convolutional code, is treated as a component encoder of the SCC system. A novel non-coherent reception algorithm is proposed, which is capable of bridging the performance gap between coherent and non-coherent receivers by iteratively exchanging extrinsic information. Since no a priori channel state information (CSI) is available for the proposed non-coherent decoding approach, a low-complexity APP channel estimator is devised and incorporated to provide estimated channel coefficients using the a posteriori probability (APP) generated by the inner decoder. Results of SCC schemes with absolutely-encoded coherently-detected PSK are also presented to demonstrate that differential systems do not necessarily cause performance degradation.