

## Artificial Bee Colony Optimization for SNR Maximization through Relay Selection in Underlay Cognitive Radio Networks

**Authors :** Babar Sultan, Kiran Sultan, Waseem Khan, Ijaz Mansoor Qureshi

**Abstract :** In this paper, a novel idea for the performance enhancement of secondary network is proposed for Underlay Cognitive Radio Networks (CRNs). In Underlay CRNs, primary users (PUs) impose strict interference constraints on the secondary users (SUs). The proposed scheme is based on Artificial Bee Colony (ABC) optimization for relay selection and power allocation to handle the highlighted primary challenge of Underlay CRNs. ABC is a simple, population-based optimization algorithm which attains global optimum solution by combining local search methods (Employed and Onlooker Bees) and global search methods (Scout Bees). The proposed two-phase relay selection and power allocation algorithm aims to maximize the signal-to-noise ratio (SNR) at the destination while operating in an underlying mode. The proposed algorithm has less computational complexity and its performance is verified through simulation results for a different number of potential relays, different interference threshold levels and different transmit power thresholds for the selected relays.

**Keywords :** artificial bee colony, underlay spectrum sharing, cognitive radio networks, amplify-and-forward

**Conference Title :** ICECECE 2014 : International Conference on Electrical, Computer, Electronics and Communication Engineering

**Conference Location :** Barcelona, Spain

**Conference Dates :** August 18-19, 2014