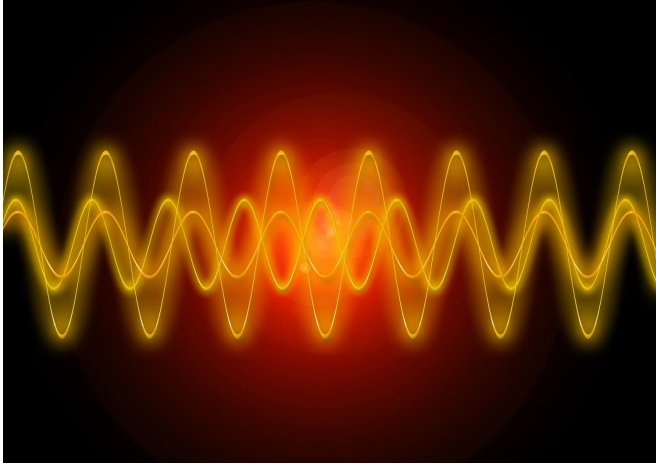


Natural spectral lines

30 May 2019, by David Bradley



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Certain ranges of frequency across the electromagnetic spectrum are reserved by regulators for particular applications: TV, digital radio, Wi-Fi, Bluetooth etc. Unregulated devices are precluded from broadcasting on these spread frequencies. However, much of the bandwidth is unused across vast swathes of the planet and could be used by other devices, but for those legal constraints.

Writing in the *International Journal of Internet Protocol Technology*, Naziha Ali Saoucha and Badr Benmammour of the LTT Laboratory of Telecommunication Tlemcen, in Algeria explain how they have taken a bio-inspired approach to an orthogonal frequency-division multiplexing (OFDM) radio system. The approach offers the user a high-quality service without interfering with other user systems. It exploits three algorithms inspired by nature: the firefly, bat, and cuckoo search. The team has simulated their approach and compared it to the real-life alternatives—the classical genetic [algorithm](#) and particle swarm optimization—for link adaptation.

"Our proposed algorithms exhibit [better](#)

[performance](#) in terms of convergence speed and solution quality with saving rates reaching over 98.93% and 46.60%, respectively," the team reports. It allows secondary, users to operate in the holes between the spread of frequencies reserved by law for the primary users. The system could cope with 1024 sub-carriers. The approach could be useful in wireless healthcare applications, multimedia, and elsewhere.

More information: Naziha Ali Saoucha et al. Bio-inspired approaches for OFDM-based cognitive radio, *International Journal of Internet Protocol Technology* (2019). [DOI: 10.1504/IJPT.2019.099680](#)

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