Performance Analysis of IK Channel in Free space Optics with PSO

[1]Nirali Shah, [2]Dr.Ved Vyas Dwivedi, [3]Dr.Bhavin Sedani

[1]Assistant Professor, [2]Director, [3]Associate Professor
Sal Institute of Engineering and research, Ahmedabad, Gujarat, India

Abstract: Free Space Optics (FSO) is a conversation technological know-how that makes use of mild propagating in free house to transmit records between two points. The science is beneficial the place the bodily connections via the ability of fiber optic cables are impractical due to excessive prices or different considerations. It has attracted the interest of researches in the final decade due to its low cost, excessive facts charge and security. We examine distinct relay decision schemes with free house optics IK channel. We additionally examine overall performance of PSO Algorithm in free area optical communication. So, it will provide important points of overall performance of free house optical conversation in exceptional channel with one of a kind algorithm for distinct relay resolution schemes

Index Terms: Free Space Optics (FSO), Relay-selection, Signal to Noise Ratio (SNR), Line-of-Site (LOS), PSO (Partial swarm Optimization

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I. INTRODUCTION

Free Space Optics (FSO) is a verbal exchange science that uses mild propagating in free area to transmit information between two points. The technological know-how is beneficial the place the bodily connections by using the potential of fiber optic cables are impractical due to excessive charges or different considerations. It has attracted the interest of researches in the closing decade due to its low cost, excessive records fee and security. We evaluate special relay choice schemes with free house optics K channel and Gamma Gamma channel. We additionally evaluate overall performance of PSO and DE algorithm in free house optical communication. So, it will supply important points of overall performance of free house optical conversation in extraordinary channel with exceptional algorithm for one of a kind relay choice schemes.

II. SYSTEM MODEL

The figure shows the system model of single relay and multi relay wireless network.
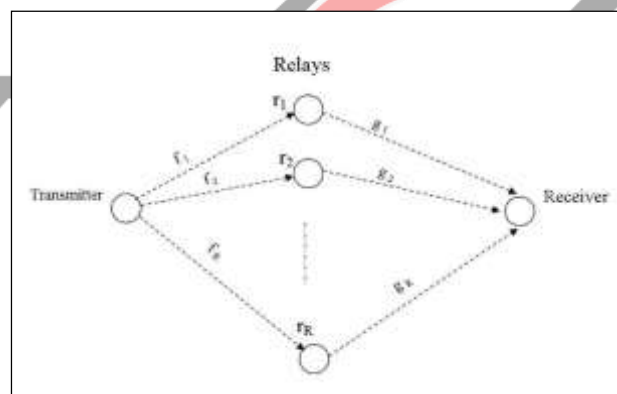

Fig 1: Single and multi-relay wireless network

Above system model shows the single source and single destination with multiple relay. We applied this system model in free space optical communication. With nearest neighbor and best Snr relay selection method we can select one relay which BER is lesser than other. The channel between transmitter to relay, relay to source are fi and gi respectively. Each relay knows its own channel but receiver knows all relays channels.

All power level of relay is same value P/Pi, where power used at transmitter for each transmission is denoted by P and power used at Relay i for each transmission is Pi.Relay which is selected only cooperate with its full power and other relay with zero power which are not cooperate.

When only Relay *i* cooperates, the received SNR is:

$$SNR_i = \frac{|f_i g_i|^2 PP_i}{1 + |f_i|^2 P + |g_i|^2 P_i}$$

(a) BEST SNR METHOD.

the relay whose path has the maximum SNR will be selected for the cooperation [12]. The selection function for best selection SNR scheme is given as:

$$h(f_i, g_i, P_i) = \frac{PP_i |f_i g_i|^2}{1 + P|f_i|^2 + P_i |g_i|^2}$$

(b)NEARESTMETHOD

In nearest neighbor selection, the relay that is the nearest to the base station is chosen [12]. The decision feature for the nearest neighbor relay choice scheme is given as:

$$h(f_i, g_i, P_i) = \max\left\{ P|f_i|^2, P_i |g_i|^2 \right\}$$

III. FSO LINK AND PSO ALGORITHM

For sturdy turbulence channels, the place Scintillation Index is almost 1, that is fashionable deviation is equal to common fee of the sign and the cost of log depth variance is between three and 4, the depth facts are given by way of the K distribution. The K turbulence mannequin can be regarded as a mixture of two specific fashions exponential distribution and gamma distribution. We bought high-quality similarity between theoretical and experimental values the use of this mannequin. The K distribution channel mannequin can be derived from a modulation system whereby the conditional chance density characteristic of irradiance, I is ruled by means of the bad exponential distribution. This channel mannequin is working in each scenarios- vulnerable turbulence and robust turbulence. Moreover, it has much less computation complexity than gamma-gamma channel model

This algorithm is based totally on social conduct of birds inside a flok. Birds search excellent meals location with have an effect on of different birds. In this way we will make use of PSO in free area optics to pick best relay which have much less BER .Bird will alternate its role with appreciate to the neighbor [13]. Swarm is comparable to populace of relay nodes, whilst particle is associated to man or woman relay. We can take forty to 50 relays with optimization of particle swarm methods.

Unlike Generic algorithm, this algorithm will now not alternate the variety of relays [13]. With equal range of relay, it solely modifications the function of relay, this algorithm does no longer have mutation or recombination in populace of relay. Each relay have an effect on and have interaction with different relay. Instead, it depends on the social conduct of the particles. In each and every generation, every particle adjusts its trajectory based totally on its exceptional role (local best) and the function of the first-rate particle (global best) of the complete population. This idea will increase the stochastic nature of the particle and converge shortly to a international minimal with a practical desirable Solution Each relay i has its nearby Ni (a subset of P).
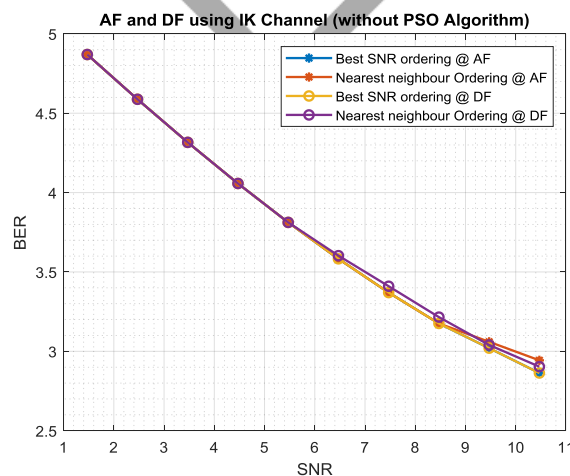
IV. SIMULATION RESULT
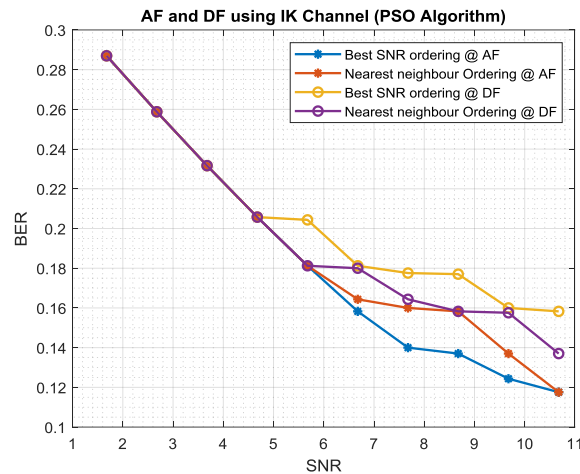

Fig. 2 IK Channel without PSO

Fig. 3 IK Channel with PSO

Figure 2, 3 shows the plot of BER versus SNR for IK channel in FSO.For IK channel performance without PSO algorithm optimization gives 4.8dB BER value for 10 dB SNR.We can reduce BER value by 0.1200dB for 10 dB SNR value when it works with PSO algorithm.in this way with help of PSO algorithm we can reduce the BER value and improve performance of free space optics channel.

VI. CONCLUSION

Free space optical communication system using cooperative relays has lots of advantages in the mitigation of both atmospheric turbulence and path loss effects, where the propagation distance increases these effects and the relays shorten the propagation distance. From the simulation con result PSO algorithm for IK Channel. We can analyze the performance of FSO in IK channel in with and without PSO algorithm case. With PSO algorithm it gives better performance in case of BER in both BEST RELAY SELECTION method and Nearest relay selection methods.

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