

This article deals with the problem of blind separation of statistically independent sources from the instantaneous linear model ( $n \times n$ ). When the observation signals are affected by the additive white gaussian noise (AWGN), the implementation of the proposed solution is performed by following three steps. The first step is a whitening process. The second step aims to convert the uncorrelated signals into statistically independent signals. The last step consists in reducing the noise existing in the noisy estimations. The main part of the proposed solution is to determine the adequate rotating angle ( $\theta$ ) that maximizes the kurtosis of the whitened signals. This rotating angle is obtained through the use of optimization techniques by applying a genetic algorithm. The proposed solution has the advantage of not converging to a local maximum, and also the separation method can be easily generalized to converge directly towards the global maximum for the case of several sources. The results obtained by applying many simulations, prove the effectiveness and the performance of the proposed method even in the noisy case and whatever the type of the signals (stationary or non-stationary).