A JOINT SPACE-FREQUENCY DISTRIBUTION OF OPTICAL SIGNALS

Yu.M. Kozlovskii

Institute of Physics of Condensed Systems,
Nat. Acad. Sci. of Ukraine
(*1, Sventsytskyi Str., Lviv 79011, Ukraine;*
e-mail: nesh@ph.icmp.lviv.ua)

S u m m a r y

A joint space-frequency distribution, the special cases of which are the Ville and Wigner distributions, has been proposed. The frequency representation of the joint distribution has been obtained for the first time, which enabled us to remove features that arose in the coordinate representation. An expression for the joint distribution of a rectangular pulse has been calculated. A relation between the Ville and Wigner distributions has been found. In particular, it was demonstrated that the Wigner distribution is formed by rotating the Ville one on the information diagram of the conjugated coordinates (x, p) by an angle that is proportional to the joint parameter t. The results of numerical calculations of the joint space-frequency distribution of a rectangular pulse at various values of the joint parameter have been presented.