**Abstract**

In this graduation work, results of numerical calculations of fundamental mode for lasers with nonuniform unsaturable gain ditribution are presented. The Fox-Li method was used to calculate the field distribution and parameters of fundamental mode for stable resonators with two spherical mirrors and thin active medium placed on the one of them.

Character of differences of fundamental mode of laser with nonuniform gain distribution from gaussian mode of bare resonator and dependence of these differences on parameters of resonator $g_1$, $g_2$ and $N_F$ are considered. The results of calculations for various values of $g_1$, $g_2$, have shown existence of critical configurations on stability diagram. Critical configurations are concentrated near the central parts of the hyperbolas $g_1g_2$=*const* and near the point (0; 0). Some of these critical configurations have been experimentally found by some authors earlier. Fundamental mode of lasers with resonators of critical configurations essentially differs from gaussian mode of bare resonator even at rather small gain. If values of $g_1$ and $g_2$ considerably differ from each other, structure of fundamental mode comes nearer to gaussian even for resonators with critical configurations. Character of fundamental mode for different Fresnel number $N_F$ is considered for some values of $g_1$ and $g_2$. At values $N_F$ close to unity fundamental mode structure becomes closer to gaussian.

The calculated spatial distributions of inverse populations and gain for the case of end pumped solid-state lasers are presented. They were experimentally verified.