Problem 4.

A spherical mirror is installed into a telescope. Its lateral diameter is D=0,5 m and the radius of the curvature R=2 m. In the main focus of the mirror there is an emission receiver in the form of a round disk. The disk is placed perpendicular to the optical axis of the mirror (Fig.4). What should the radius r of the receiver be so that it could receive the entire flux of the emission reflected by the mirror? How would the received flux of the emission decrease if the detector's dimensions decreased by 8 times?

Directions: 1) When calculating small values α (α<<1) one may perform a substitution $\sqrt{1-\alpha} \approx 1 - \frac{\alpha}{2}$; 2) diffraction should not be taken into account.

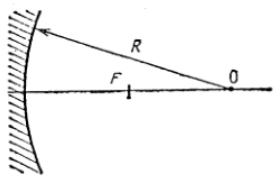


Fig. 4