

**[mex3] Gravitational field and potential of interstellar dust cloud**

A spherically symmetric cloud of interstellar dust is characterized by the mass density

$$\rho(r) = \frac{C}{r(r^2 + b^2)^2},$$

where  $C, b$  are constants. Find the gravitational field  $g(r)$  and the gravitational potential  $\Phi(r)$  of this distribution of matter.

**Solution:**