As demonstrated in Fig. 1, the red circuit (fig. 1-(a)) is rotated around Z axis, thus forming a space, Γ (Fig. 1-b). In this space, the function $C(x,y,z)$ meets the Laplace equation，

$$\frac{\partial^2 C}{\partial x^2}+\frac{\partial^2 C}{\partial y^2}+\frac{\partial^2 C}{\partial z^2}=0$$

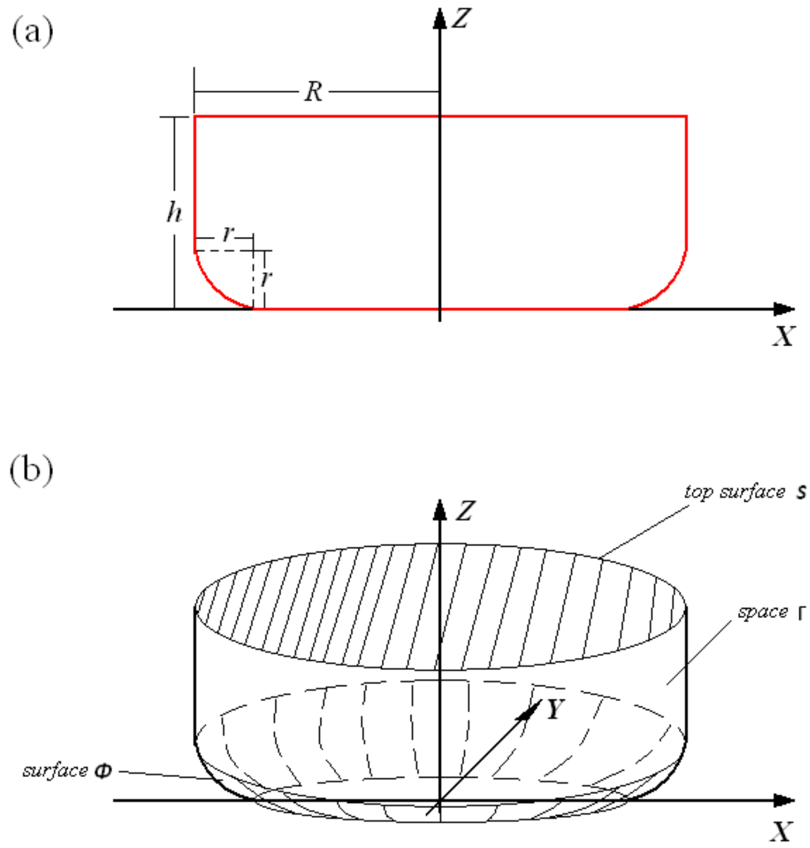


图 1

The boundary condition is listed below,

（1） At the top surface, ***S***, C=aθ, 0<a<1,（***S*** is described by $z=h, x^2+y^2\le R^2$）;

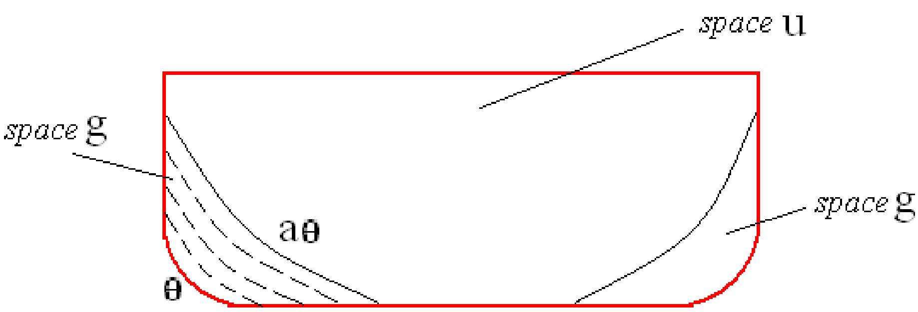
（2） At the surface,***Φ***, $C=\theta$（***Φ*** is defined by rotation of the quarter circle shown in Fig. 1-a, which is described by, $z=r-\sqrt{r^2-[\sqrt{x^2+y^2}-(R-r)]^2}$）;

（3） In the space, Γ， $C(x,y,z)$ is a constant at the circles described by $x^2+y^2=a^2, z=b(0\le a\le R, 0\le z\le h)$, which means $\frac{\partial C}{\partial x}=0, \frac{\partial C}{\partial y}=0$ at these circles;

Question 1: $C(x,y,z)$=?

（2）if $\rho(x,y,z)=\frac{\partial C}{\partial x}+\frac{\partial C}{\partial y}+\frac{\partial C}{\partial z}$， then, $\iint_{\phi}\rho(x,y,z)ds=?$

P.S.：（1）this is math model of a practical diffusion process. Practically, the solution may be demonstrated in the following figure,



in space **U**， C(x,y,z)= a**θ**,
in space **g**, *there is a gradient from* **θ** *to* a**θ**

（2）if the precise solution cannot be deduced, the approximation solution also is OK.