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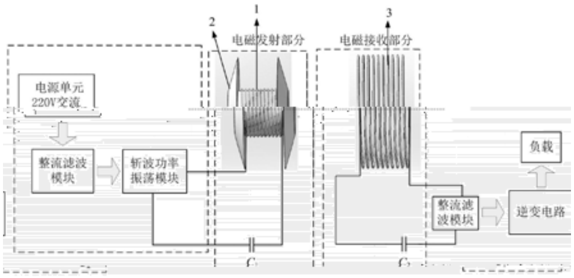

$$L_{\mathrm{eq}}=z_1+\frac{2-2F_{\mathrm{z}}\left(0,\frac{z_1}{R}\right)-\frac{z_1}{\sqrt{R^2+{z_1}^2}}}{\sqrt{1-\left(2-2F_{\mathrm{z}}\left(0,\frac{z_1}{R}\right)-\frac{z_1}{\sqrt{R^2+{z_1}^2}}\right)^2}}R$$

$$L_{\mathrm{eq}}=L+2\sqrt{(r_2-r_1)^2+h^2}\text{，}\quad F_{\mathrm{z}}\left(0,\frac{z_1}{R}\right)=F,\quad r_2=R_2\text{，}$$

$$\alpha=2\arctan\frac{r_2-r_1}{h}$$

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[0005] $$L_{eq} = z_1 + \frac{2 - 2F_z\left(0, \frac{z_1}{R}\right) - \frac{z_1}{\sqrt{R^2 + z_1^2}}}{\sqrt{1 - \left(2 - 2F_z\left(0, \frac{z_1}{R}\right) - \frac{z_1}{\sqrt{R^2 + z_1^2}}\right)^2}} R$$

[0006] $$L_{eq} = L + 2\sqrt{(r_2 - r_1)^2 + h^2}, \quad F_z\left(0, \frac{z_1}{R}\right) = F,$$

[0007]

[0008] $\alpha = 2\arctan\frac{r_2 - r_1}{h}$

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$$\xi = \frac{\rho}{R},$$

[0029] $$F_z\left(\frac{y_1}{R},\frac{z_1}{R}\right) = A\left(\frac{y_1}{R},\frac{z_1}{R}\right) + A\left(\frac{y_1}{R},\frac{L_{eq}-z_1}{R}\right) \quad (3)$$

[0030] $$F_y\left(\frac{y_1}{R},\frac{z_1}{R}\right) = B\left(\frac{y_1}{R},\frac{z_1}{R}\right) - B\left(\frac{y_1}{R},\frac{L_{eq}-z_1}{R}\right) \quad (4)$$

[0031]

[0032] $$A\left(\frac{y_1}{R},\frac{z_1}{R}\right) = \frac{1}{4\pi}\int_0^1 \xi \mathrm{d}\xi \int_0^{2\pi} \frac{\frac{z_1}{R}\mathrm{d}\theta}{\left[(\xi\cos\theta)^2 + \left(\frac{y_1}{R} - \xi\sin\theta\right)^2 + \left(\frac{z_1}{R}\right)^2\right]^{\frac{3}{2}}}$$

[0033] $$B\left(\frac{y_1}{R},\frac{z_1}{R}\right) = \frac{1}{4\pi}\int_0^1 \xi \mathrm{d}\xi \int_0^{2\pi} \frac{\left(\frac{y_1}{R} - \xi\sin\theta\right)\mathrm{d}\theta}{\left[(\xi\cos\theta)^2 + \left(\frac{y_1}{R} - \xi\sin\theta\right)^2 + \left(\frac{z_1}{R}\right)^2\right]^{\frac{3}{2}}}$$

[0034] $$A\left(\frac{y_1}{R},\frac{L_{eq}-z_1}{R}\right) = \frac{1}{4\pi}\int_0^1 \xi \mathrm{d}\xi \int_0^{2\pi} \frac{\frac{L_{eq}-z_1}{R}\mathrm{d}\theta}{\left[(\xi\cos\theta)^2 + \left(\frac{y_1}{R} - \xi\sin\theta\right)^2 + \left(\frac{L_{eq}-z_1}{R}\right)^2\right]^{\frac{3}{2}}}$$

[0035] $$B\left(\frac{y_1}{R},\frac{L_{eq}-z_1}{R}\right) = \frac{1}{4\pi}\int_0^1 \xi \mathrm{d}\xi \int_0^{2\pi} \frac{\left(\frac{y_1}{R} - \xi\sin\theta\right)\mathrm{d}\theta}{\left[(\xi\cos\theta)^2 + \left(\frac{y_1}{R} - \xi\sin\theta\right)^2 + \left(\frac{L_{eq}-z_1}{R}\right)^2\right]^{\frac{3}{2}}}$$

[0036] $$\frac{y_1}{R} = 0$$

[0037] $$F_y\left(0,\frac{z_1}{R}\right)=0 \qquad (5)$$

[0038]

[0039] $$F_z\left(0,\frac{z_1}{R}\right)=1-\frac{1}{2}\left(\frac{\frac{z_1}{R}}{\sqrt{1+\left(\frac{z_1}{R}\right)^2}}+\frac{\frac{L_{eq}-z_1}{R}}{\sqrt{1+(\frac{L_{eq}-z_1}{R})^2}}\right) \qquad (6)$$

[0040]

[0041] $$L_{eq}=z_1+\frac{2-2F_z\left(0,\frac{z_1}{R}\right)-\frac{z_1}{\sqrt{R^2+z_1^2}}}{\sqrt{1-\left(2-2F_z\left(0,\frac{z_1}{R}\right)-\frac{z_1}{\sqrt{R^2+z_1^2}}\right)^2}}R \qquad (7)$$

[0042] $L_{eq}=L+2\sqrt{(r_2-r_1)^2+h^2}$ 。

[0043] $F_z\left(0,\frac{z_1}{R}\right)=F$,

[0044]

[0045] $$\alpha=2\arctan\frac{4\left(R_2-R_1\right)}{L} \qquad (8)$$

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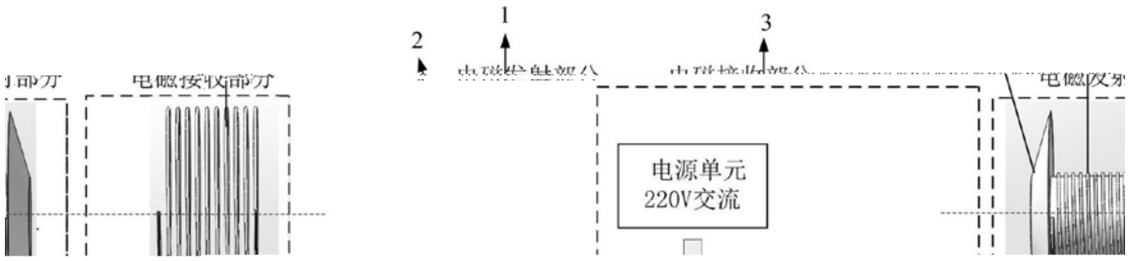
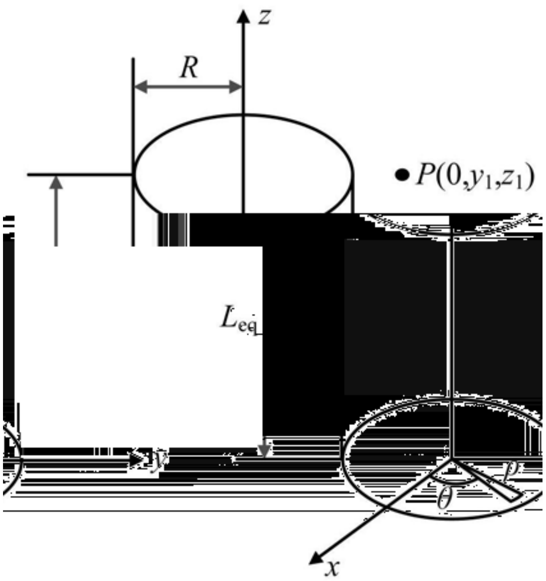
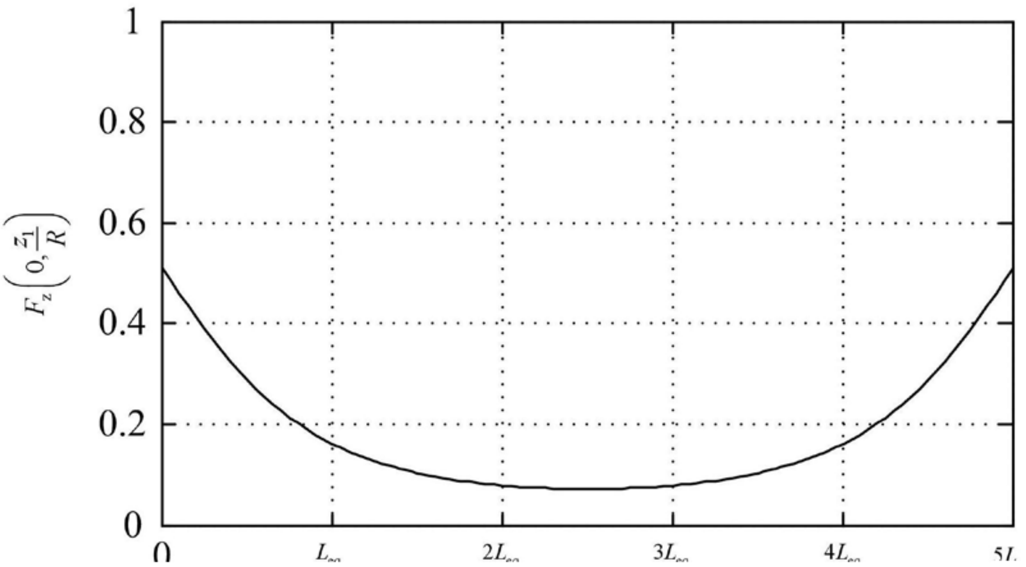
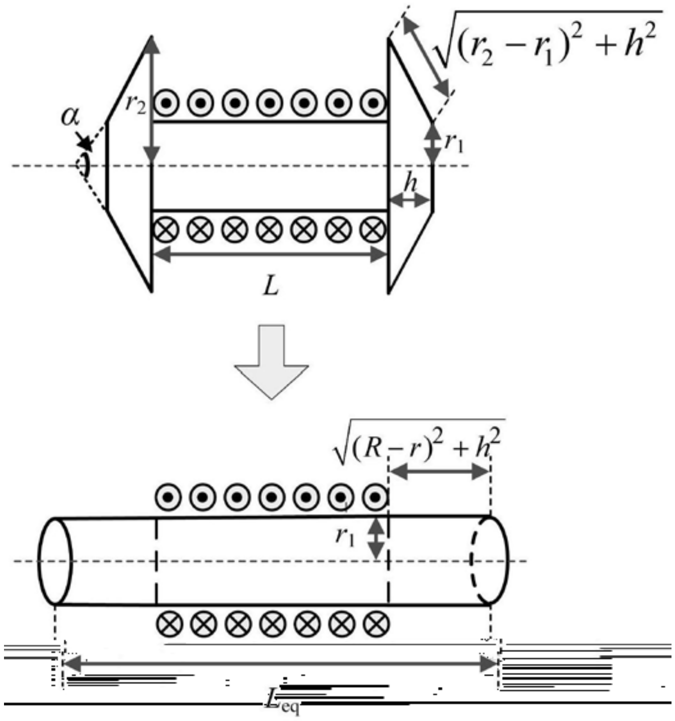

1
2
3
电源单元
220V交流

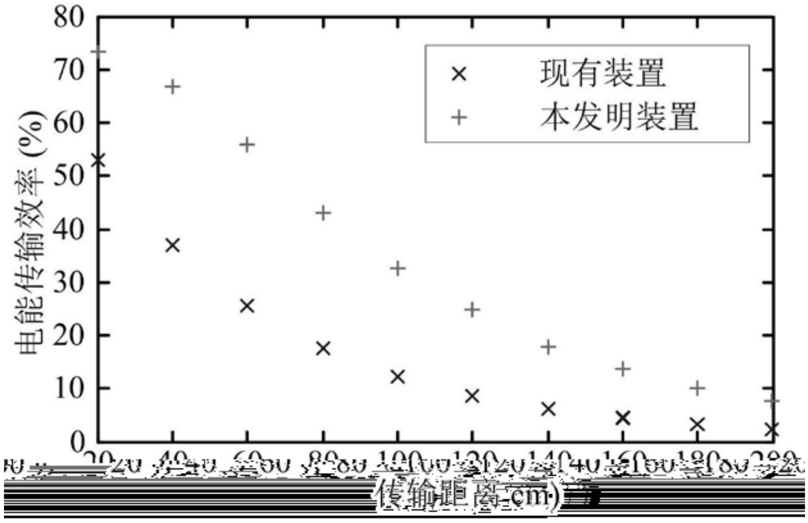

z
R
P(0,y1,z1)
Leq
θ
x



1
0.8
0.6
0.4
0.2
0
0
2L
3L
4L

α
L
h


80
70
60
50
40
30
20
10
0
电能传输效率 (%)
现有装置
本发明装置
传输距离(cm)