\[ f: \mathbb{R}^3 \rightarrow \mathbb{R}^3 \]
\[ f(x,y,z) = (x^\mu + x - y, y^\mu + y + x, z^\mu + z) \]

\[ Df(x,y,z) = \begin{bmatrix} x^\mu + 1 & -1 & 0 \\ 1 & y^\mu + 1 & 0 \\ 0 & 0 & z^\mu + 1 \end{bmatrix} \]

\[ \Rightarrow \quad \det Df(x,y,z) = (x^\mu + 1)(y^\mu + 1)(z^\mu + 1) \]

\[ f \text{ 1-one to 1, } \det Df(x,y,z) \neq 0, \quad (x,y,z) \in \mathbb{R}^3 \]

\[ f(x,y,z) = (f_1(x,y,z), f_2(x,y,z), f_3(x,y,z)) \]

\[ f_1(x,y,z) = x^\mu + x - y, \quad f_2(x,y,z) = y^\mu + y + x, \quad f_3(z) = z^\mu + z \]

\[ B = (x_1, y_1, z_1), \quad A = (x_1, y_1, z_1) \]

\[ f \text{ is continuous and } f(A) = f(B) \]

\[ \Rightarrow \quad f \circ f_1 - f = f \circ f_2 - f \]
\[
0 = \Phi(A) - \Phi(B) = D\Phi(C) \cdot (A-B)
\]
\[
0 = \Phi(C) - \Phi(B) = D\Phi(C) \cdot (A-B)
\]
\[
0 = \Phi(C) - \Phi(B) = D\Phi(C) \cdot (A-B)
\]

\[
\Rightarrow \begin{cases}
D\Phi(C) \cdot (A-B) = 0 \\
D\Phi(C) \cdot (A-B) = 0 \\
D\Phi(C) \cdot (A-B) = 0
\end{cases}
\]

\[
A - B = \begin{bmatrix} U \\ V \\ W \end{bmatrix}
\]

\[
\begin{bmatrix}
\mu_{C_{1}}^{p} + 1 & -1 & 0 \\
1 & \mu_{C_{1}}^{p} + 1 & 0 \\
0 & 0 & \mu_{C_{1}}^{p} + 1
\end{bmatrix} \begin{bmatrix} U \\ V \\ W \end{bmatrix} = 0
\]

\[
\begin{bmatrix}
(\mu_{C_{1}}^{p} + 1)U - V = 0 \\
U + (\mu_{C_{1}}^{p} + 1)V = 0 \\
(\mu_{C_{1}}^{p} + 1)W = 0
\end{bmatrix}
\]

\[
\Rightarrow U = V = W = 0
\]

\[
A = B
\]
\[
\hat{g}_f = \iiint_{\mathcal{V}} d\mathbf{v} \quad \iiint_{\mathcal{V}} d\mathbf{v} \quad \iiint_{\mathcal{V}} d\mathbf{v} \quad \iiint_{\mathcal{V}} d\mathbf{v} \quad \iiint_{\mathcal{V}} d\mathbf{v} \\
\text{det} \, Df \, dx \, dy \, dz \\
= \iiint_{\mathcal{V}} \left[ (c_1 + 1)(c_2 + 1)(c_3 + 1) + (c_4 + 1) \right] \, dx \, dy \, dz \\
= \int_{0}^{1} (c_1 + 1) \, dx \, \int_{0}^{1} (c_2 + 1) \, dy \, \int_{0}^{1} (c_3 + 1) \, dz \\
+ \int_{0}^{1} (c_4 + 1) \, dz = p \cdot p + p + 1 = 1.
\]

\[
\begin{cases}
F_0 : \mathbb{R}^n \to \mathbb{R}^m \\
F(x, y, u, v) = (F_1(x, y, u, v), F_2(x, y, u, v)) \\
\text{where} \quad F_1(x, y, u, v) = uv \text{ and } F_2(x, y, u, v) = x + y + u + v.
\end{cases}
\]

\[F = (-1, 1)\]
\[
\det D_{(u,v)} F(P_0) \neq 0, \quad P_0 = (1, -1, 1, -1)
\]
\[
U(1, -1) = 1
\]
\[
V(1, -1) = -1
\]

\[
\begin{bmatrix}
D_{(x,y)} F(P_0) & D_{(u,v)} F(P_0)
\end{bmatrix}
\]

\[
\begin{bmatrix}
y & x & V+1 & U+1 \\
u x y + y e + u + v & u x y + x e + u + v & v x + x y + u + v & u x y + x e + y e + u + v
\end{bmatrix}
\]

\[
\Rightarrow D_{(u,v)} F(P_0) = \begin{bmatrix} 0 & 1 \\ -1 & 0 \end{bmatrix}
\]

\[
\Rightarrow \det D_{(u,v)} F(P_0) = 0 \neq 0.
\]
\[
\begin{align*}
&\begin{cases}
  u(x,y) + v(x,y) + xy + u(x,y) + v(x,y) = -1 \\
  u(x,y) v(x,y) e^{x+y} + x y e^{x+y} = -1
\end{cases} \\
\end{align*}
\]

\[
\begin{align*}
&\begin{cases}
  u v + u v + y + y + v = 0 \\
  u v + u v e^{x+y} + u v e^{x+y} + y e^{x+y} + x y (y + v) e^{u+v} = 0
\end{cases}
\end{align*}
\]

\[
V = V(1,-1) = -1 \quad \Rightarrow \quad u = u(1,-1) = 1, \quad y = -1, \quad x = 1
\]

\[
\begin{align*}
&\begin{cases}
  -u_x (1,-1) + v_x (1,-1) - 1 + u_x (1,-1) + v_x (1,-1) = 0 \\
  -u_x (1,-1) + v_x (1,-1) - 1 - u_x (1,-1) - v_x (1,-1) = 0
\end{cases} \\
\end{align*}
\]

\[
\Rightarrow \begin{cases}
  v_x (1,-1) = 1 \\
  -u_x (1,-1) = 1 \quad \Rightarrow \quad v_x (1,-1) = \frac{1}{4} \\
  u_x (1,-1) = -1
\end{cases}
\]
\[
\begin{align*}
\begin{cases}
uy + uv_y + x + uy + vy = 0 \\
(y + vy)
\end{cases}
\]\
\Rightarrow \\
\begin{cases}
-u_y(1-1) + vy(1-1) + 1 + u_y(1-1) + vy(1-1) = 0 \\
-u_y(1-1) + vy(1-1) - 1 + 1 - (u_y(1-1) + vy(1-1)) = 0 \\

\Rightarrow \\
\begin{cases}
yy(1-1) = -1 \quad \Rightarrow \quad Vy(1-1) = -\frac{1}{y} \\
-yy(1-1) = 0 \quad \Rightarrow \quad u_y(1-1) = 0
\end{cases}
\]
\end{align*}
\]

\[
\begin{align*}
\begin{cases}
xy + uv + xvy + 1 + uy + vy = 0 \\
xy + uv + xvy + xye^{x+y} + uv e^{x+y} + uve^{x+y} + y e^{x+y} \\
+ uve^{x+y} + uve^{x+y} + e + y (y + vy) e^{u+v} \\
+ x (y + vy) e^{u+v} + xy (y + vy) e^{u+v} \\
+ xy (y + vy) (y + vy) e^{u+v} = 0
\end{cases}
\]
\]
\[ u(1,1) = 1 \quad ; \quad u_x(1,1) = -1 \quad ; \quad V_y(1,1) = -\frac{1}{\lambda} \]

\[ V(1,1) = -1 \quad ; \quad V_x(1,1) = \frac{1}{\lambda} \quad ; \quad u_y(1,1) = 0 \]

\[ \begin{cases}
-\frac{u_y(1,1)}{x} + \frac{V_y(1,1)}{x} + 1 + \frac{u_y(1,1)}{x} + \frac{V_y(1,1)}{x} = 0 \\
-\frac{u_y(1,1)}{x} + \frac{1}{\lambda} + \frac{V_y(1,1)}{x} + \frac{1}{\lambda} - \frac{1}{\lambda} - 1 + \frac{1}{\lambda} - \frac{1}{\lambda} - (\frac{u_y(1,1)}{x} + \frac{V_y(1,1)}{x}) + \frac{1}{\lambda} (-\frac{1}{\lambda}) = 0
\end{cases} \]

\[ \Rightarrow \begin{cases}
\frac{V_y(1,1)}{x} = -1 \\
-\frac{u_y(1,1)}{x} = -\frac{1}{\lambda}
\end{cases} \quad \Rightarrow \quad \begin{cases}
\frac{V_y(1,1)}{x} = -\frac{1}{\lambda} \\
\frac{u_y(1,1)}{x} = \frac{1}{\lambda}
\end{cases} \]
درpunk توضیح از استفاده می‌کنم:

\[ f(x, y, z) = xyz \]
\[ g(x, y, z) = x^r + y^r - 1 = 0 \]
\[ h(x, y, z) = y^r + z^r - 1 = 0 \]

\[ \rightarrow \left\{ \begin{array}{l}
\nabla f = \lambda \nabla g + \mu \nabla h \\
g = 0 \\
h = 0
\end{array} \right. \]

\[ \nabla f = (yz, xz, xy) \quad , \quad \nabla g = (rx, 0, rz) \]
\[ \nabla h = (0, ry, rz) \]

\[ \begin{array}{l}
yz = r x \lambda \\
xz = r y \mu \\
xy = r z (\lambda + \mu) \\
x^r + z^r = 1 \\
y^r + z^r = 1
\end{array} \]

\[ \text{سپاس برای مطالعه به درستی} \]

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\[ x = 0, \quad y = 0, \quad z = \pm 1, \quad \lambda = -M \]

\[ |x| = \frac{|z|}{4} \]

\[ |x| = \frac{1}{\sqrt{16}}, \quad |y| = \frac{1}{\sqrt{16}}, \quad |z| = \frac{1}{\sqrt{16}}, \quad \lambda = M = \pm \frac{1}{\sqrt{16}} \]

\[ \min, \max \text{ subject to } f(x, y, z) = xyz \]

\[ \begin{cases} x \rightarrow -x \\ y \rightarrow -y \\ z \rightarrow -z \end{cases} \]

\[ \text{Thus, } h = 0, g = 0 \quad \Rightarrow \quad f(-x, -y, -z) = -xyz \]

\[ f_{\min}, f_{\max} \text{ subject to } f(x, y, z) = xyz \]
\[
\begin{align*}
\text{ максیمیم } f & = xz + yz + xz, \quad \text{که } x, y, z \geq 0 \quad \text{ساییت } \frac{5\sqrt{3}}{\sqrt{c}}.
\end{align*}
\]

\[
\begin{align*}
\text{اگر } n & < m, \quad 0 < a, \quad x, y, z \geq 0, \quad x, y, z \leq 1,
\end{align*}
\]

\[
\begin{align*}
x & = \frac{\sqrt[4]{x}}{\sqrt[4]{c}}, \quad y = \frac{\sqrt[4]{y}}{\sqrt[4]{c}}, \quad z = \frac{1}{\sqrt[4]{c}}.
\end{align*}
\]

\[
\begin{align*}
\lambda = m = \frac{1}{\sqrt[4]{c}}.
\end{align*}
\]

\[
\begin{align*}
\text{سرکشی} & \quad \text{یعنی } \lambda \geq 1. \text{درکنید}.
\end{align*}
\]

\[
\begin{align*}
\text{این فضا را به مجموعه } \mathbb{R}^3 \text{ تقسیم می‌کند.}
\end{align*}
\]

\[
\begin{align*}
Z = \frac{1}{\sqrt[4]{c}}, \quad x = -\frac{\sqrt[4]{z}}{\sqrt[4]{c}}, \quad y = -\sqrt[4]{z}.
\end{align*}
\]

\[
\begin{align*}
\text{حال ساییت } \frac{5\sqrt{3}}{\sqrt{c}}, \quad \text{ساییت } \frac{5\sqrt{3}}{\sqrt{c}}.
\end{align*}
\]

\[
\begin{align*}
\min f & = -\max f
\end{align*}
\]

\[
\begin{align*}
\Rightarrow \begin{cases}
\min f & = -\frac{1}{n\sqrt{c}} \\
\max f & = \frac{1}{n\sqrt{c}}
\end{cases}
\end{align*}
\]
\[
\int_{0}^{\pi} \left( \int_{0}^{r} \left( \int_{0}^{\rho} \cos z e^{\frac{y}{x}} \, dx \right) \, dz \right) \, dy
\]

\[
= \int_{0}^{\pi} \int_{0}^{r} \left( \int_{0}^{\pi} \cos z e^{\frac{y}{x}} \, dy \right) \, dx \, dz
\]

\[
= \int_{0}^{\pi} \int_{0}^{r} \left[ x \cos z e^{\frac{y}{x}} \right]_{y=0}^{y=x} \, dx \, dz
\]

\[
= \int_{0}^{\pi} \int_{0}^{r} x \cos z e^{\frac{x}{x}} \, dx \, dz
\]
\[ \int_0^\infty \int_0^\infty \left\{ x \cos z \ e^{\frac{1}{z}} - x \cos z \right\} \, dx \, dz \]

\[ = (\sqrt{e} - 1) \int_0^\infty \int_0^\infty x \cos z \, dx \, dz \]

\[ = (\sqrt{e} - 1) \left( \int_0^\infty \cos z \, dz \right) \left( \int_0^\infty x \, dx \right) \]

\[ = (\sqrt{e} - 1) \cdot 1 \cdot (\infty) = \infty \cdot (\sqrt{e} - 1) \]
\[ F(x,y,z) = \left( e^x - \frac{y}{x'^2 + y'^2}, e^y + \frac{x}{x'^2 + y'^2}, e^z \right) \]

\[ \Rightarrow \text{curl} \space F = \nabla \times F = \begin{vmatrix} \frac{\partial}{\partial x} & e^x - \frac{y}{x'^2 + y'^2} \\ \frac{\partial}{\partial y} & e^y + \frac{x}{x'^2 + y'^2} \\ \frac{\partial}{\partial z} & e^z \end{vmatrix} \]

\[ = \begin{vmatrix} \frac{\partial}{\partial y} e^z - \frac{\partial}{\partial z} \left( e^y + \frac{x}{x'^2 + y'^2} \right) \\ \frac{\partial}{\partial x} \left( e^z \right) - \frac{\partial}{\partial z} \left( e^x - \frac{y}{x'^2 + y'^2} \right) \\ \frac{\partial}{\partial x} \left( e^y + \frac{x}{x'^2 + y'^2} \right) - \frac{\partial}{\partial y} \left( e^x - \frac{y}{x'^2 + y'^2} \right) \end{vmatrix} \]

\[ = \begin{vmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ \frac{x'^2 + y'^2 - x' - y'}{(x'^2 + y'^2)^2} + \frac{x'^2 + y'^2 - y'}{(x'^2 + y'^2)^2} \end{vmatrix} = 0 \]

\[ Y(t) = (X(t), X'(t), X''(t)) \]

\[ = \begin{cases} (P + \cos \theta) \cos \theta t \\ (P + \cos \theta) \sin \phi t \\ (P + \cos \theta) \cos (\sin t) \end{cases} \]
\[ \int_C F \cdot dr = \int_0^{\pi} F(\gamma(t)) \cdot \dot{\gamma}(t) \, dt \]

\[ = \int_0^{\pi} \left( e^{x_1} - \frac{x_r}{x_1r + x_1r} \right) d\gamma(t) + \int_0^{\pi} \left( e^{x_1} + \frac{x_1}{x_1r + x_1r} \right) d\gamma(t) + \int_0^{\pi} e^{x_1(t)} \, dx(t) + \int_0^{\pi} e^{x_1(t)} \, dx(t) \]

\[ = e^{x_1(t)} \Bigg|_0^{\pi} = e^{x_1(\pi)} - e^{x_1(0)} \]

\[ = \int_0^{\pi} e^{x_1(t)} \, dx_1(t) \]

\[ \cdot \quad \int_0^{\pi} e^{x_1(t)} \, dx_1(t) = e^{x_1(t)} \Bigg|_0^{\pi} = 0. \]

\[ \int_0^{\pi} F \cdot dr = \int_0^{\pi} \frac{-x_r}{x_1r + x_1r} \, d\gamma(t) + \int_0^{\pi} \frac{x_1}{x_1r + x_1r} \, d\gamma(t) = \int P \cdot dr \]

\[ \cdot \quad P = \left( -\frac{y}{x_1r + yr}, \frac{x}{x_1r + yr} \right), \quad \gamma(t) = (x(t), x_1(t)) \]
\begin{align*}
\text{curl } \mathbf{P} &= \mathbf{0} \\
\int_C \mathbf{F} \cdot d\mathbf{r} &= \int_p \mathbf{P} \cdot d\mathbf{r} = \int_p \mathbf{P} \cdot d\mathbf{r} = \int_0^{\pi} \frac{-\sin kt}{\sin^2 kt + \cos^2 kt} \, d\left(\cos kt\right) \\
&+ \int_0^{\pi} \frac{\cos kt}{\sin^2 kt + \cos^2 kt} \, d\left(\sin kt\right) \\
&= \int_0^{\pi} \left( \frac{p}{\sin^2 k + \cos^2 k} \right) \, dt \\
&= \frac{\pi}{2}
\end{align*}
\[
\int p \, dr = \int_0^{\pi} \frac{-\sin \theta \(r + \cos \theta\)}{(r + \cos \theta)^2} \, d \left[ (r + \cos \theta) \cos \theta \right] \\
\quad + \int_0^{\pi} \frac{\cos \theta \(r + \cos \theta\)}{(r + \cos \theta)^2} \, d \left[ (r + \cos \theta) \sin \theta \right] \\
= \int_0^{\pi} \frac{-\sin \theta}{r + \cos \theta} \left( -\sin \theta \cos \theta - (r + \cos \theta)(r \sin \theta) \right) \, d\theta \\
\quad + \int_0^{\pi} \frac{\cos \theta}{r + \cos \theta} \left( -\sin \theta \sin \theta + (r + \cos \theta)(r \cos \theta) \right) \, d\theta \\
= \int_0^{\pi} \frac{\sin \theta \cos \theta \sin \theta}{r + \cos \theta} - \frac{\cos \theta \sin \theta \sin \theta}{r + \cos \theta} \, d\theta \\
\quad + \int_0^{\pi} r \sin \theta \, d\theta + \int_0^{\pi} r \cos \theta \, d\theta = \int_0^{\pi} r \, d\theta = \pi r
\]
\[ \vec{F}(x,y,z) = h(xfy + z^r) \left( x \hat{i} + y \hat{j} + z \hat{k} \right) \]

\[ h : \mathbb{R}^3 \to \mathbb{R} \]

\[ \vec{F}(x,y,z) = h(xfy + z^r) x \hat{i} + h(xfy + z^r) y \hat{j} + h(xfy + z^r) z \hat{k} \]

\[ F_x(x,y,z) = h(xfy + z^r) x \]

\[ F_y(x,y,z) = h(xfy + z^r) y \]

\[ F_z(x,y,z) = h(xfy + z^r) z \]

\[ \frac{\partial F_x}{\partial y} = \frac{\partial F_x}{\partial x}, \quad \frac{\partial F_x}{\partial z} = \frac{\partial F_y}{\partial x}, \quad \frac{\partial F_x}{\partial z} = \frac{\partial F_y}{\partial y} \]

\[ \frac{\partial F_y}{\partial y} = xy \cdot h'(xfy + z^r), \quad \frac{\partial F_y}{\partial x} = xy \cdot h'(xfy + z^r) \]

\[ \frac{\partial F_y}{\partial z} = xz \cdot h'(xfy + z^r), \quad \frac{\partial F_y}{\partial x} = xz \cdot h'(xfy + z^r) \]

\[ \frac{\partial F_y}{\partial z} = yz \cdot h'(xfy + z^r), \quad \frac{\partial F_y}{\partial y} = yz \cdot h'(xfy + z^r) \]

\[ \nabla \cdot \vec{F} = F \cdot \nabla \]
\[
\begin{align*}
\frac{\partial f}{\partial x} &= F_1 \\
\frac{\partial f}{\partial y} &= F_r \\
\frac{\partial f}{\partial z} &= F_n
\end{align*}
\]

\[
\Rightarrow \quad \frac{\partial f}{\partial x} = x \ h(x+fy+rz) \quad \Rightarrow \quad f(x,y,z) = \int_{t}^{t} h(t+fy+rz) \ dt + k(y,z)
\]

\[
\Rightarrow \quad f(x,y,z) = \frac{1}{r} \int_{y+rz}^{x+fy+rz} h(u) du + k(y,z)
\]

\[
\frac{\partial f}{\partial y} = y \ h(x+fy+rz) = \frac{1}{r} \left( y h(x+fy+rz) - y h(y+rz) \right) + \frac{\partial k}{\partial y}
\]

\[
\Rightarrow \quad \frac{\partial k}{\partial y} = y \ h(y+rz) \quad \Rightarrow \quad k(y,z) = \frac{1}{r} \int_{z}^{y+rz} h(u) du + C(z)
\]

\[
\Rightarrow \quad f(x,y,z) = \frac{1}{r} \int_{y+rz}^{x+fy+rz} h(u) du + \frac{1}{r} \int_{z}^{y+rz} h(u) du + C(z)
\]

\[
= \frac{1}{r} \int_{z}^{x+fy+rz} h(u) du + C(z)
\]
\[
\frac{df}{dz} = z h(x+y+z^r) = c'(z) + \frac{1}{r} \left( \frac{z h(x+y+z^r)}{z^r} - \frac{z h(z^r)}{z^r} \right)
\]

\[\Rightarrow \quad c'(z) = z h(z^r)\]

\[\Rightarrow \quad c(z) = \frac{1}{r} \int_{0}^{z^r} h(u) \, du\]

\[\Rightarrow \quad f(x,y,z) = \frac{1}{r} \int_{0}^{z^r} h(u) \, du + \frac{1}{r} \int_{z^r}^{x+y+z^r} h(u) \, du\]

\[\Rightarrow \quad f(x,y,z) = \frac{1}{r} \int_{0}^{x+y+z^r} h(u) \, du\]

\[\text{هذا التعبير باللغة العربية.}\]

\[\text{يفتح تحليل النسبة المثلثية.}\]

\[\text{ج.}\]

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\( \text{div } F = 0 \iff \frac{\partial F_x}{\partial x} + \frac{\partial F_y}{\partial y} + \frac{\partial F_z}{\partial z} = 0 \)

\[ h(x^2 + y^2 + z^2) + 1 \cdot x \cdot h'(x^2 + y^2 + z^2) + h(x^2 + y^2 + z^2) \\
+ 2y \cdot h'(x^2 + y^2 + z^2) + h(x^2 + y^2 + z^2) + 1z \cdot h'(x^2 + y^2 + z^2) = 0 \]

\[ u = x^2 + y^2 + z^2 \]

\[ \mu h(u) + \rho u h'(u) = 0 \iff \frac{h'(u)}{h(u)} = -\frac{\mu}{\rho u} \]

\[ \ln h(u) = -\frac{\mu}{\rho} \ln u + C \iff h(u) = \frac{c}{u^{\frac{\mu}{\rho}}} \]

\[ h(u) = cu^{\frac{-\mu}{\rho}} \]
\[ D = \{ (x, y, 1) : x, y \in \mathbb{R}^2 \} \Rightarrow \mathbf{n} = \hat{k} = (0, 0, 1) \] (4)

\[
\iint_D F \cdot \mathbf{n} \, ds = \iint_D z \cdot h(x^2 + y^2 + z^2) \, ds
\]

\[
= \iint_D z \cdot c (x^2 + y^2 + z^2)^{-1/2} \, ds
\]

\[
= \int \int \frac{c}{(x^2 + y^2 + 1)} \, dx \, dy
\]

\[
= \int_0^{\pi} \int_0^{\infty} \frac{cr}{(r^2 + 1)^{1/2}} \, dr \, d\theta
\]

\[
= \pi c \int_0^{\infty} \frac{r}{(r^2 + 1)^{1/2}} \, dr
\]

\[
= \pi c \int_0^{\infty} \frac{du}{u^{1/2} (u^2 + 1)^{1/2}} = \pi c \left. (-\ln(u + 1))^{1/2} \right|_0^{\infty}
\]

\[
= \pi c
\]
$\mathcal{D}' = \{ (x, y, 1) : -1 \leq x, y \leq 1, \; z = 1 \}$

$\Rightarrow \quad \vec{n} = \hat{k} = (0, 0, 1)$

$\Rightarrow \quad \iint_{\mathcal{D}'} F \cdot \vec{n} \; ds = \iint_{\mathcal{D}'} z \; h(x^2 y^2 + z^4) \; ds$

$= \iint_{\mathcal{D}'} \frac{cz}{(x^2 y^2 + z^4)^{\frac{4}{3}}} \; ds$

$= \int_{-1}^{1} \int_{-1}^{1} \frac{c}{(x^4 y^4 + 1)^{\frac{4}{3}}} \; dx \; dy$
\[ \begin{align*}
&= r \left( \int_0^{\pi/2} \int_0^{\pi/2} \frac{1}{\cos \theta} \frac{cr}{(r^2 + 1)^{3/2}} \, dr \, d\theta + \int_0^{\pi/2} \int_0^{\pi/2} \frac{1}{\sin \theta} \frac{cr}{(r^2 + 1)^{3/2}} \, dr \, d\theta \right) \\
&= r \left( \int_0^{\pi/2} \frac{-c}{(1 + \frac{1}{\cos \theta})^{1/2}} \, d\theta + \int_0^{\pi/2} \frac{-c}{(1 + \frac{1}{\sin \theta})^{1/2}} \, d\theta \right) \\
&= r \int_0^{\pi/2} \frac{\cos \theta}{\sqrt{1 + \cos \theta}} \, d\theta - r \int_0^{\pi/2} \frac{\sin \theta}{\sqrt{1 + \sin \theta}} \, d\theta \\
&= r \left( \sin^{-1}\left(\frac{\sin \theta}{\sqrt{1+\cos \theta}}\right) \bigg|_0^{\pi/2} \right) - r \left( \sin^{-1}\left(\frac{\cos \theta}{\sqrt{1+\sin \theta}}\right) \bigg|_0^{\pi/2} \right) \\
&= r \left( \frac{\pi}{2} \right) - r \left( \frac{\pi}{2} \right) = rmc - \frac{rsc}{r} = \frac{rmc}{r} \\
\end{align*} \]