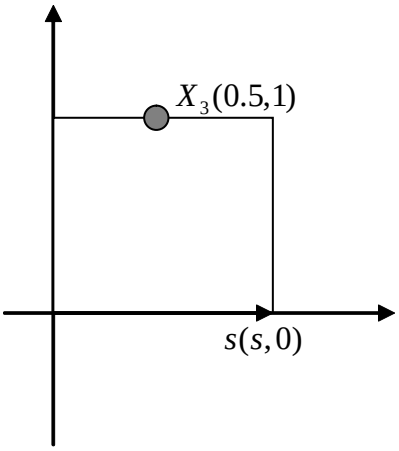


$y_1 = 0.5 - s$

$y_2 = 1$

$n = (n_1, n_2) = (0, -1)$

$n = (n_1, n_2) = (0, 1)$

$$U(s, x) = \ln|s - x| = \ln(r) = \ln\left(\sqrt{(0.5 - s)^2 + 1^2}\right)$$

$$U_{31} = \int_0^1 \ln\left(\sqrt{(s - 0.5)^2 + 1^2}\right) ds = 0.038867$$

$$T(s, x) = \frac{-y_i n_i}{r^2} = \frac{1}{(s - 0.5)^2 + 1^2}$$

$$T_{31} = \int_0^1 \frac{1}{(s - 0.5)^2 + 1^2} ds = 0.927295$$

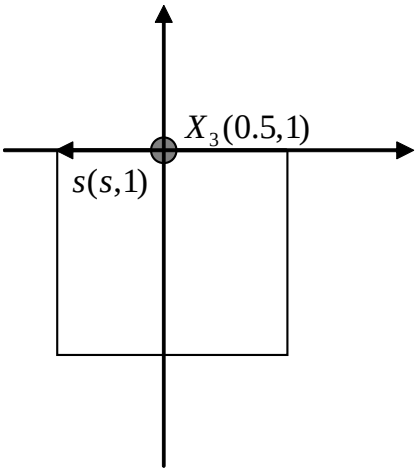
$$L(s, x) = \frac{y_i n_i}{r^2} = \frac{1}{(s - 0.5)^2 + 1^2}$$

$$L_{31} = \int_0^1 \frac{1}{(s - 0.5)^2 + 1^2} ds = 0.927295$$

$$M(s, x) = \frac{2 y_i n_i y_j n_j}{r^4} - \frac{n_i n_i}{r^2} = \frac{-2}{((s - 0.5)^2 + 1^2)^2} + \frac{1}{(s - 0.5)^2 + 1^2}$$

$$M_{31} = \int_0^1 \left(\frac{-2}{((s - 0.5)^2 + 1^2)^2} + \frac{1}{(s - 0.5)^2 + 1^2}\right) ds = -0.8$$

Null



$$U(s, x) = \ln(R) - \sum_{m=1}^{\infty} \left(\frac{1}{m}\right) \left(\frac{\rho}{R}\right)^m \cos[m(\theta - \phi)]$$

$$(\rho, \phi) = 0, \theta = 0$$

$$U(s, x) = \ln(R)$$

$$U_{33} = U_{31} = 2 \int_0^{0.5} \ln(R)\, dR = -1.69315$$

$$T(s, x) = \frac{\partial U}{\partial s_2} = \sin[\theta] \frac{\partial U}{\partial R} + \frac{\cos[\theta]}{R} \frac{\partial U}{\partial \theta}$$

$$= \sin[\theta] \left(\frac{1}{R} + \sum_{m=1}^{\infty} \frac{\rho^m}{R^{m+1}} \cos[m(\theta - \phi)]\right) + \frac{\cos[\theta]}{R} \sum_{m=1}^{\infty} \left(\frac{\rho^m}{R^m}\right) \sin[m(\theta - \phi)]$$

$$(\rho, \phi) = 0, \theta = 0$$

$$T(s, x) = 0$$

$$L(s, x) = \frac{\partial U}{\partial x_2} = \sin[\phi] \frac{\partial U}{\partial \rho} + \frac{\cos[\phi]}{\rho} \frac{\partial U}{\partial \phi}$$

$$= \sin[\phi] \left(-\sum_{m=1}^{\infty} \frac{\rho^{m-1}}{R^m} \cos[m(\theta - \phi)] + \frac{1}{\rho} \cos[\phi] \left(-\sum_{m=1}^{\infty} \left(\frac{\rho}{R}\right)^m \sin[m(\theta - \phi)]\right)\right)$$

$$(\rho, \phi) = 0, \theta = 0$$

$$L(s, x) = 0$$

$$M(s, x) = \frac{\partial L}{\partial s_2} = \sin[\theta] \frac{\partial L}{\partial R} + \frac{\cos[\theta]}{R} \frac{\partial L}{\partial \theta}$$

$$=$$

$$\sin[\phi] \sin[\theta] \left(\sin[\phi] \sum_{m=1}^{\infty} m \frac{\rho^{m-1}}{R^{m+1}} \cos[m(\theta - \phi)]\right) + \frac{\sin[\theta] \cos[\phi]}{\rho} \left(\sum_{m=1}^{\infty} m \frac{\rho^m}{R^{m+1}} \sin[m(\theta - \phi)]\right)$$

$$+ \frac{\cos[\theta]}{R} \left(\sin[\phi] \sum_{m=1}^{\infty} m \frac{\rho^{m-1}}{R^m} \sin[m(\theta - \phi)]\right) +$$

$$\frac{1}{R} \cos[\theta] \left(\frac{1}{\rho} \cos[\phi] \left(-\sum_{m=1}^{\infty} m \left(\frac{\rho}{R}\right)^m \cos[m(\theta - \phi)]\right)\right)$$

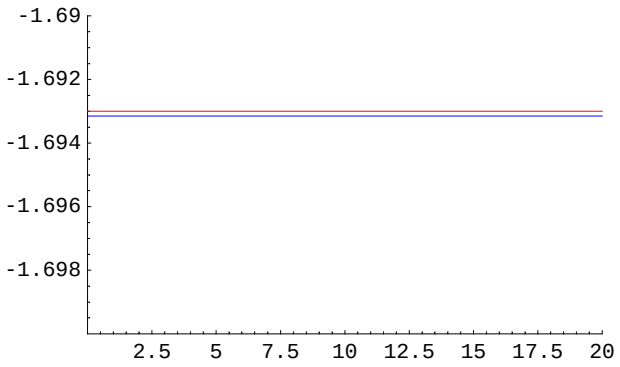
$$(\rho, \phi) = 0, \theta = 0$$

$$2\int_{\varepsilon}^{0.5}\frac{1}{\rho R}\left(-\sum_{m=1}^{\infty}m\left(\frac{\rho}{R}\right)^{m}\right)dR=2\int_{\varepsilon}^{0.5}\left(-\sum_{m=1}^{\infty}m\,\frac{\rho^{m-1}}{R^{m+1}}\right)dR$$

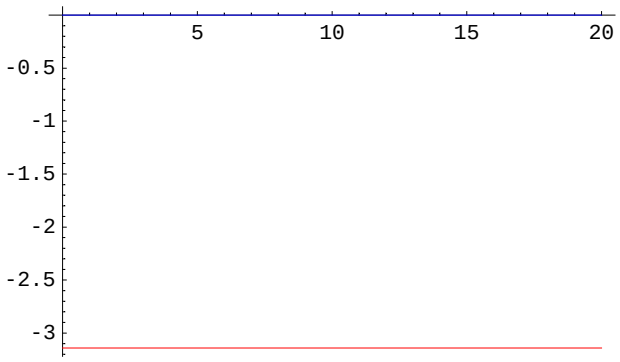
$$=2\int_{\varepsilon}^{0.5}\frac{-1}{R^{2}}\,dR=\frac{2}{R}\Big|_{\varepsilon}^{0.5}=4-\frac{2}{\varepsilon}$$

$$M_{33}=2\int_{\varepsilon}^{0.5}\frac{1}{\rho R}\left(-\sum_{m=1}^{\infty}m\left(\frac{\rho}{R}\right)^{m}\right)dR+\frac{2}{\varepsilon}=4$$

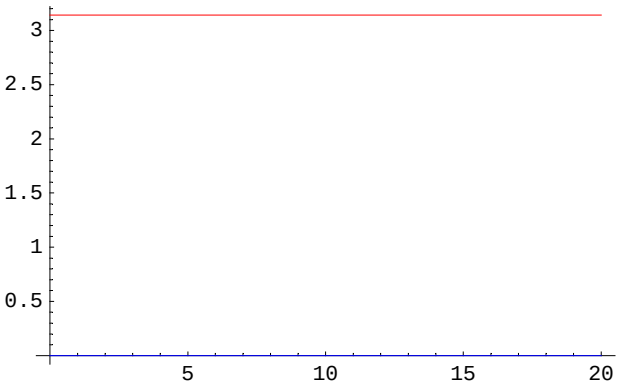
```
dat1 := Table[{c, 2 ∫_0^0.5 (Log[e, R]) dR}, {c, 0, 20}]
dat2 := Table[{d, -1.693}, {d, 0, 20}]
g3 := ListPlot[dat1, PlotJoined → True, PlotStyle → {RGBColor[0, 0, 1]}]
g4 := ListPlot[dat2, PlotJoined → True, PlotStyle → {RGBColor[1, 0, 0]}]
Show[{g3, g4}, PlotRange → {{0, 20}, {-1.69, -1.7}}]
```



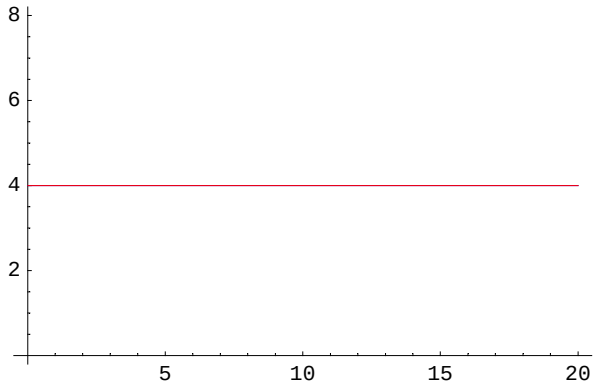

```
dat1 := Table[{e, 0}, {e, 0, 20}]
dat2 := Table[{f, -π}, {f, 0, 20}]
g5 := ListPlot[dat1, PlotJoined → True, PlotStyle → {RGBColor[0, 0, 1]}]
g6 := ListPlot[dat2, PlotJoined → True, PlotStyle → {RGBColor[1, 0, 0]}]
Show[{g5, g6}, PlotRange → All]
```



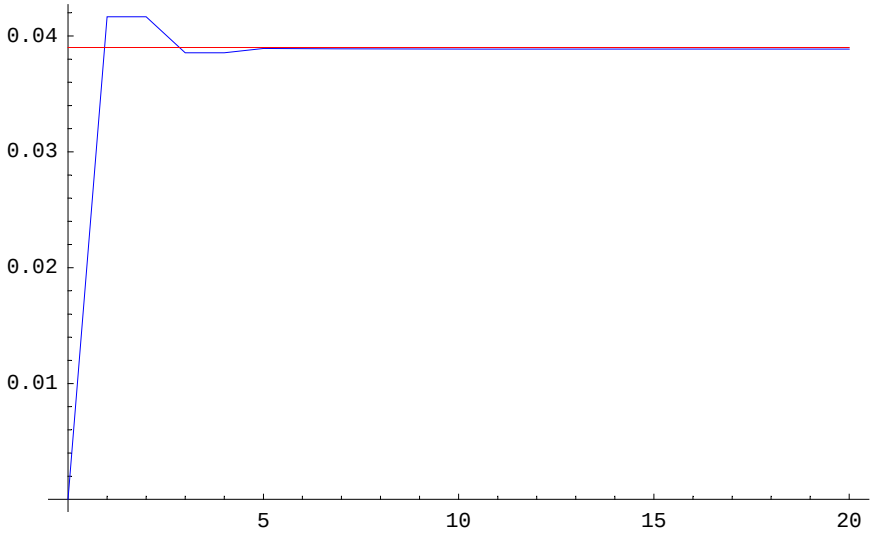

```
dat1 := Table[{g, 0}, {g, 0, 20}]
dat2 := Table[{h, π}, {h, 0, 20}]
g7 := ListPlot[dat1, PlotJoined → True, PlotStyle → {RGBColor[0, 0, 1]}]
g8 := ListPlot[dat2, PlotJoined → True, PlotStyle → {RGBColor[1, 0, 0]}]
Show[{g7, g8}, PlotRange → All]
```



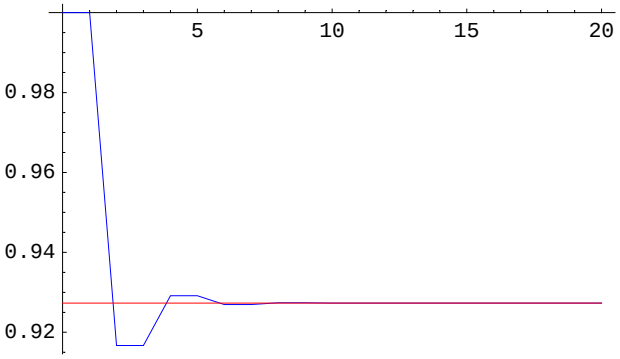
```
dat1 := Table[{i, 4}, {i, 0, 20}]
dat2 := Table[{j, 4}, {j, 0, 20}]
g9 := ListPlot[dat1, PlotJoined → True, PlotStyle → {RGBColor[0, 0, 1]}]
g10 := ListPlot[dat2, PlotJoined → True, PlotStyle → {RGBColor[1, 0, 0]}]
Show[{g9, g10}, PlotRange → All]
```



```
dat1 := Table[{a, 2 ∫_0^0.5 (-∑_{m=0}^{a} 1/(m+1) (R)^(m+1) Cos[(m+1) π/2]) dR}, {a, 0, 20}]
dat2 := Table[{b, 0.039}, {b, 0, 20}]
g1 := ListPlot[dat1, PlotJoined → True, PlotStyle → {RGBColor[0, 0, 1]}]
g2 := ListPlot[dat2, PlotJoined → True, PlotStyle → {RGBColor[1, 0, 0]}]
Show[{g1, g2}, PlotRange → All]
```

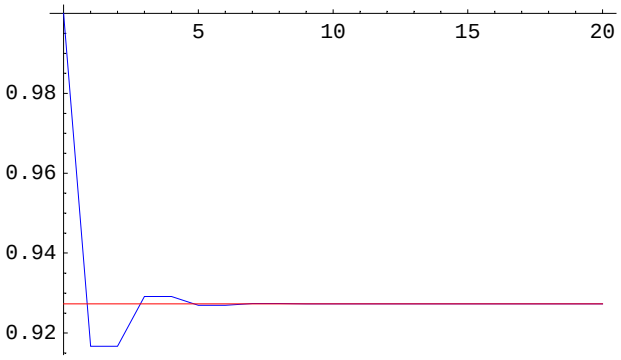



```
dat1 := Table[{a, 2 ∫_0^0.5 (∑_{m=0}^{a} (R)^m Sin[(m+1) π/2]) dR}, {a, 0, 20}]
dat2 := Table[{b, 0.927295}, {b, 0, 20}]
g1 := ListPlot[dat1, PlotJoined → True, PlotStyle → {RGBColor[0, 0, 1]}]
g2 := ListPlot[dat2, PlotJoined → True, PlotStyle → {RGBColor[1, 0, 0]}]
Show[{g1, g2}, PlotRange → All]
```



$$\text{dat1} := \text{Table}\left[\left\{a, 2\int_0^{0.5}\left(1+\sum_{m=0}^{a}(R)^{m+1}\,\text{Cos}\left[\frac{(m+1)\,\pi}{2}\right]\right)\text{d}R\right\}, \{a, 0, 20\}\right]$$

```
dat2 := Table[{b, 0.927295}, {b, 0, 20}]
g1 := ListPlot[dat1, PlotJoined → True, PlotStyle → {RGBColor[0, 0, 1]}]
g2 := ListPlot[dat2, PlotJoined → True, PlotStyle → {RGBColor[1, 0, 0]}]
Show[{g1, g2}, PlotRange → All]
```



$$\text{dat1} := \text{Table}\left[\left\{c, 2\int_0^{0.5}\left(-\sum_{m=0}^{c}\left((m+1)\,(R)^{m}\,\text{Sin}\left[\frac{(m+1)\,\pi}{2}\right]\right)\right)\text{d}R\right\}, \{c, 0, 20\}\right]$$

```
dat2 := Table[{d, -0.8}, {d, 0, 20}]
g1 := ListPlot[dat1, PlotJoined → True, PlotStyle → {RGBColor[0, 0, 1]}]
g2 := ListPlot[dat2, PlotJoined → True, PlotStyle → {RGBColor[1, 0, 0]}]
Show[{g1, g2}, PlotRange → All]
```