à Función de Green para el problema de Dirichlet interior a dos esferas concéntricas conectadas a tierra.

Los parámetros son "a" para el radio menor, "b" para el radio mayor y la carga puntual unitaria está ubicada en r=d

```
Par = 8a ® 2, b ® 4, d ® 3.5<;
x = b/a;
A = a/d;
B = b/d;
```

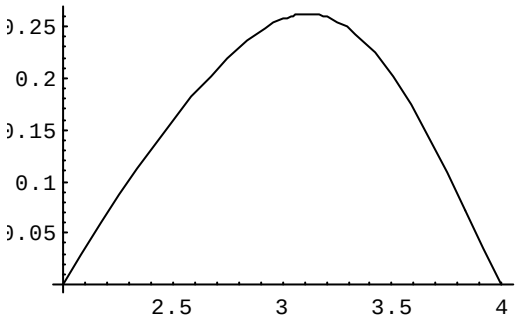
Escribo la función de Green tomando 30 términos del desarrollo en serie...

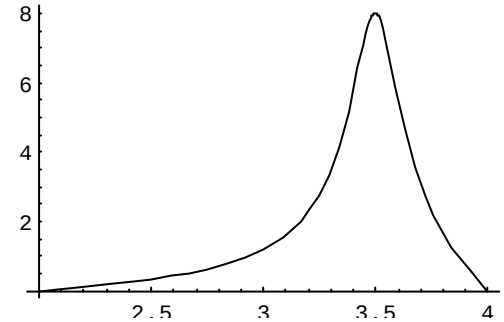
```
f@r_, a_D := SumA 1/x^i
```

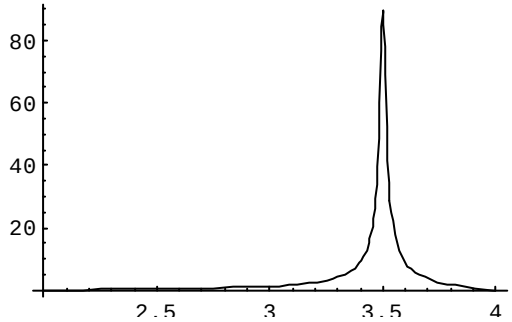
$$\sum_{k}^{i}\left(\frac{1}{\sqrt{1+\left(r/x^{2i}\right)^2-2\,r\,\cos(aD)/x^{2i}}}-\frac{A}{\sqrt{1+\left(r\,x^{2i}\right)^2-2\,r\,x^{2i}\cos(aD)}}\right)+$$

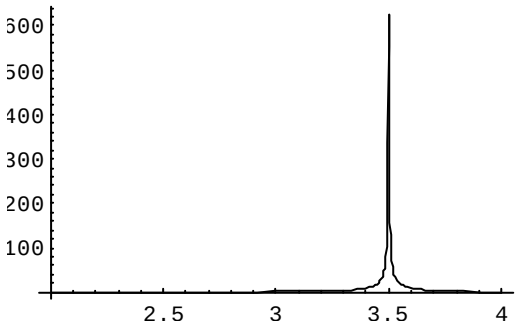
$$x^i\sum_{k}^{i}\frac{1}{\sqrt{Hr^2+Hx^{2i}L\,dL^2-2\,r\,d\,x^{2i}L\cos(aD)}}-$$

$$B\,'I'\,Hr^2+HB^2\,x^{2i}L\,dL^2-2\,r\,d\,x^{2i}L\,B^2\cos(aD)L\Big)\Big)\Big)









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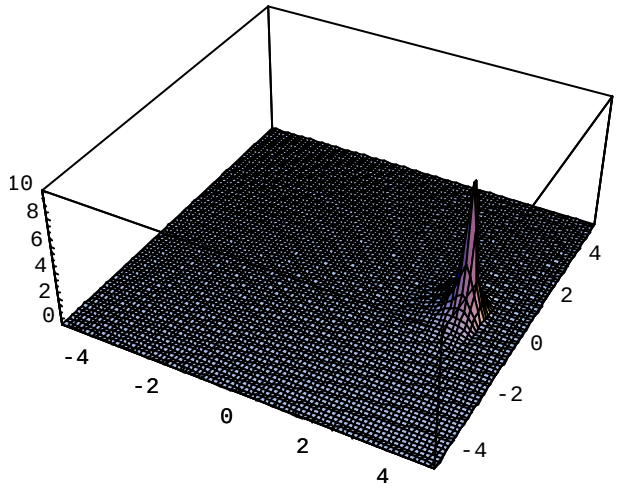
Ahora graficamos la función de Green en una lista de gráficos tridimensionales para ver su variación característica a distintas escalas. Observar que la condición de contorno solo se pone en evidencia a escalas pequeñas mientras que la presencia de la carga real aparece evidente cuando aumentamos la escala....

```
CartesianForm@u_, v_D = f@r, aD •. 9r -> Sqrt[u^2 + v^2], Cos@aD ® u/Sqrt[u^2 + v^2]=;

Green@u_, v_D := IfAHa •. ParL < Sqrt[u^2 + v^2] < Hb •. ParL, CartesianForm@u, vD, 0E;

Table@Plot3D@Green@u, vD, 8u, -5, 5<, 8v, -5, 5<,
   PlotPoints ® 80, PlotRange ® 80, 10^H-nL<D, 8n, -1, 6<D;
```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8
6
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-4
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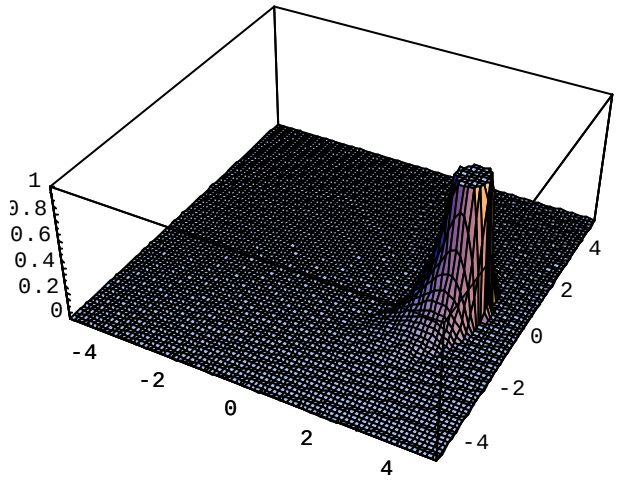
4
2
0
-2
-4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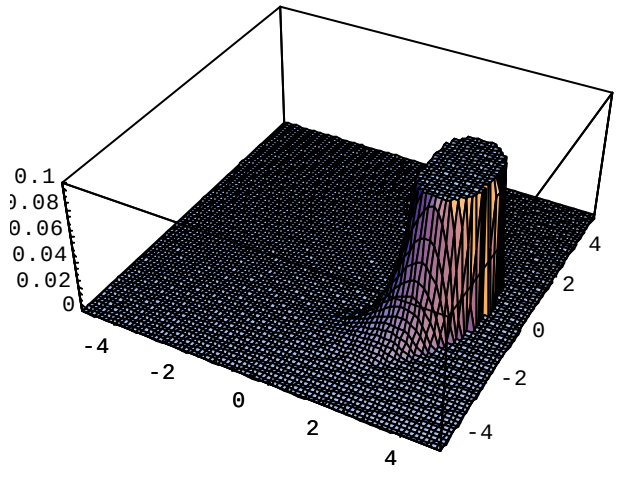
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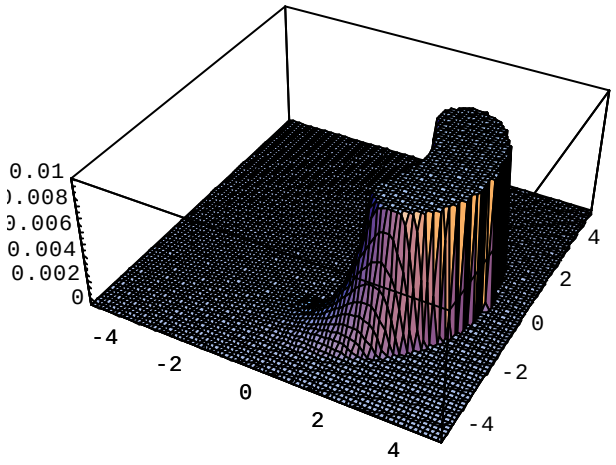
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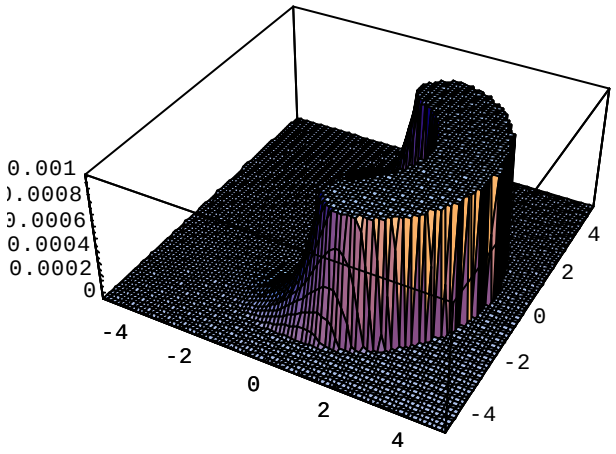
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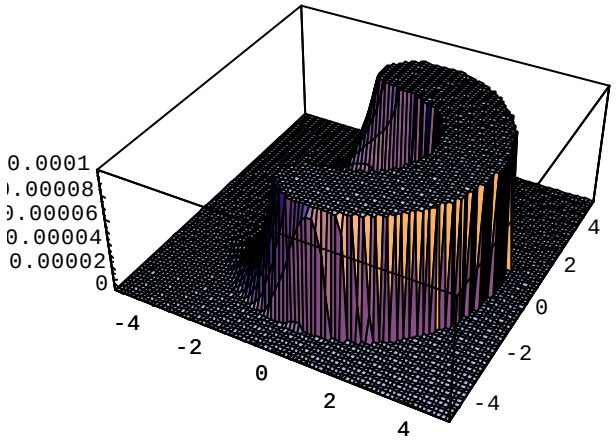
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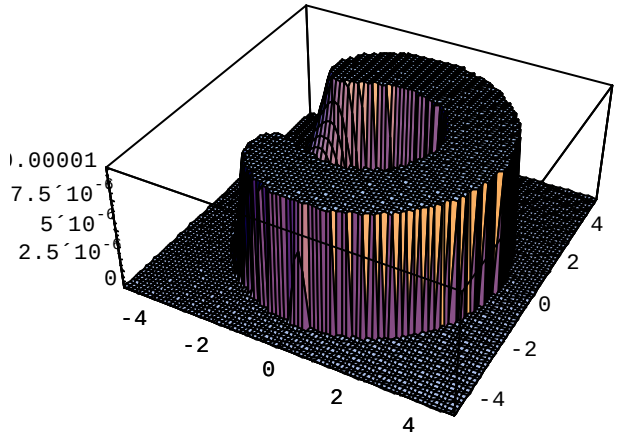
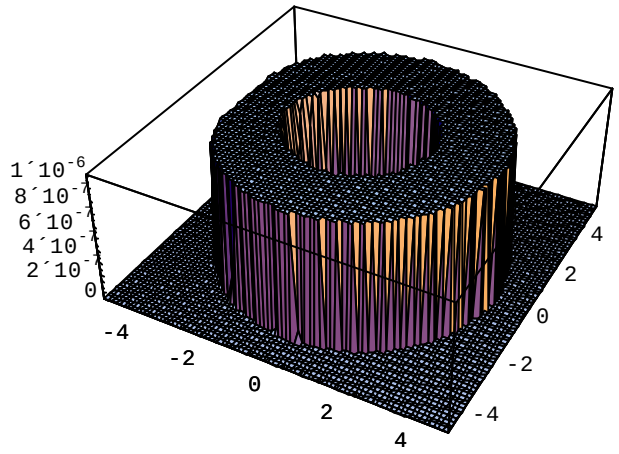




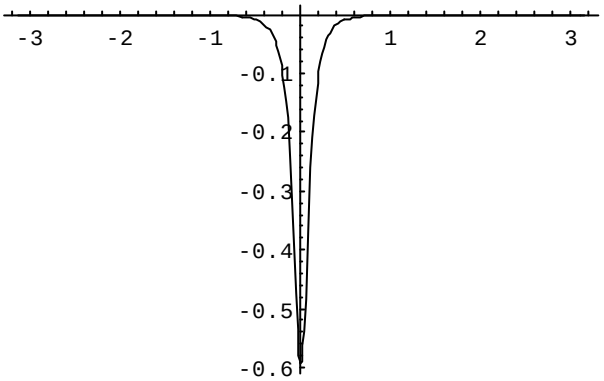
Ahora vemos un gráfico de contornos de la función de Green en escala logarítmica para eliminar las diferencias de variaciones características según la escala.

```
Green2@u_, v_D := IfAHa •. ParL < • ¡¡¡¡¡¡¡¡¡¡¡¡¡¡¡¡ u^2 + v^2 < Hb •. ParL, Log@CartesianForm@u, vDD, 0E;
ContourPlot@Green2@u, vD, 8u, -5, 5<, 8v, -5, 5<, PlotPoints ® 80, ContourLines ® FalseD;
```

à Carga inducida en las superficies de las esferas:

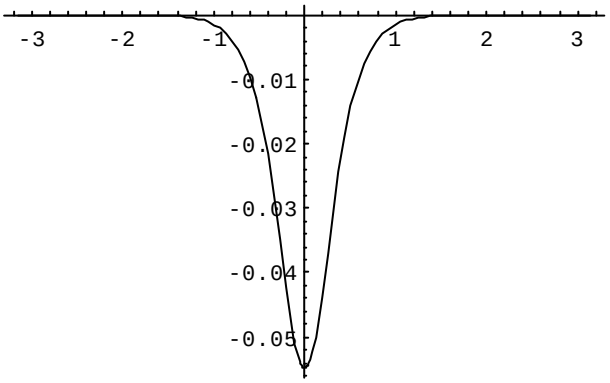
Sigmab y Sigmaa son las cargas inducidas en las superficies de las esferas (observar que, como deben, ambas densidades son negativas)

```
Sigmab = 1/(4 p) D@f@r, aD, rD /. 8r → Hb /. ParL<;
Plot@Sigmab, 8a, -p, p<, PlotRange → AllD
```



… Graphics …

```
Sigmaa = -1/(4 p) D@f@r, aD, rD /. 8r → Ha /. ParL<;
Plot@Sigmaa, 8a, -p, p<, PlotRange → AllD
```



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