

Material properties used by Eric:

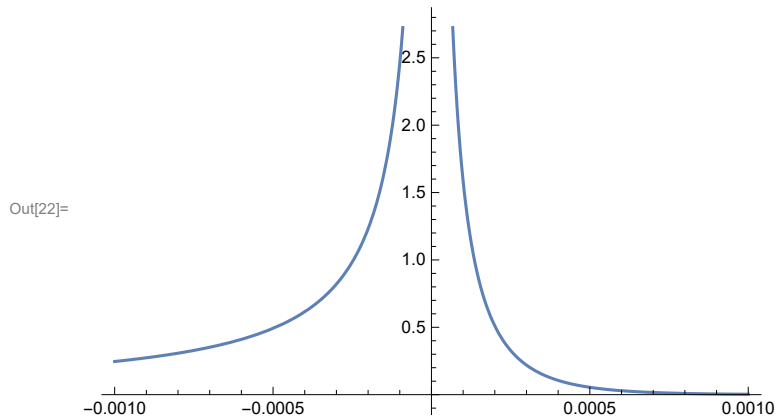
In[7]:= $\rho = 0.008 \times 10^6$; $cp = 0.55 \times 10^3$; $k = 0.05 \times 10^3$; $\omega = 0.2 \times 10^{-3}$; $v = 50 \times 10^{-3}$; $Po = 66.5$;

In[8]:= $\eta := k / (\rho cp)$; $\delta := 2 \eta / v$; $T0 = 20$; $Tm = 880$;

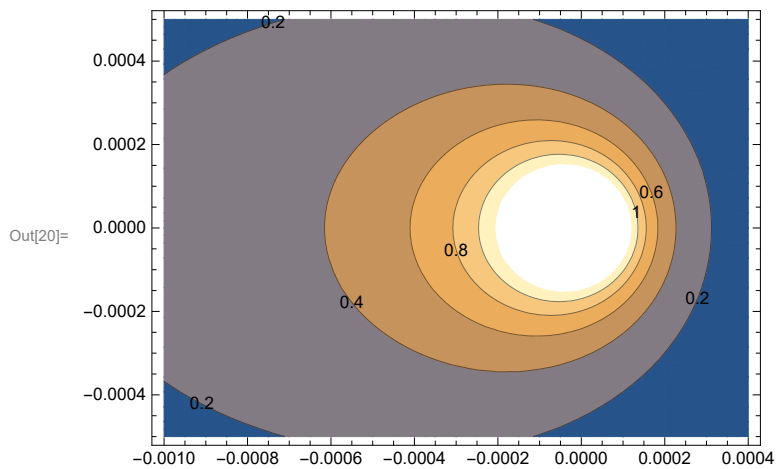
In[9]:= $\theta[P_, \kappa_, V_, x_, y_, z_] :=$

$$P / \left(2 \pi k \sqrt{x^2 + y^2 + z^2} (Tm - T0) \right) \text{Exp} \left[-V \left(\sqrt{x^2 + y^2 + z^2} + x \right) / (2 \kappa) \right];$$

In[22]:= $\text{Plot}[\theta[Po, \eta, v, x, 0, 0], \{x, -10 \times 10^{-4}, 10 \times 10^{-4}\}]$



In[20]:= $\text{ContourPlot}[\theta[Po, \eta, v, x, y, 0.0], \{x, -10 \times 10^{-4}, 4 \times 10^{-4}\},$
 $\{y, -5 \times 10^{-4}, 5 \times 10^{-4}\}, \text{ContourLabels} \rightarrow \text{True}, \text{AspectRatio} \rightarrow \text{True}]$



In[23]:= $F[u_] := 1 / (u \pi) \text{Integrate}[1 - \text{Exp}[-2 u / (1 + s^2)], \{s, 0, \infty\}]$
 $\nu[Po_, \omega_, v_] := Po / (k \pi \omega) F[v \omega / (2 \eta)]$

In[26]:= $\nu[Po, \omega, v] // N$

Out[26]= 1737.29