stripload_comparison

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In [1]:
```python
%pylab inline
from scipy.integrate import trapz,quad,romberg,dblquad
from math import *
```

Populating the interactive namespace from numpy and matplotlib

1 Original boussinesq with ν parameter

Equation 11.20 from Bowles, σ_x component

In [2]:
```python
def b(Q, x, y, z, nu):
    R = sqrt(x**2+y**2+z**2)
    r = sqrt(x**2+y**2)
    return Q/(2*pi)*(3*r**2*z/R**5-(1-2*nu)/(R*(R+z)))*(x/r)

#integrate fro x1 to x2 and from -inf to inf to from the strip load
def boussinesq_stripload(q,x1,x2,H,z,nu):
    return dblquad(lambda y, x: b(q, x, y, z, nu), x1, x2, \
                   lambda x: float("-inf"), lambda x: float("inf"))[0]
```

2 NAVFAC DM 7.01 strip load

In [3]:
```python
def navfac_stripload(q, x1, x2, z):
    gamma = atan(x1/z)
    alpha = atan(x2/z) - gamma
    return (q/pi)*(alpha-sin(alpha)*cos(alpha+2*gamma))
```

3 Comparison

In [4]:
```python
q = 200.0  # 200 psf strip load
x1 = 5.0 # starting at 5' from wall
x2 = x1 + 10.0 # ending at 15' from wall
H = 10.0 # 10' wall

nu = 0.5

z = np.arange(0.0,H+H/100.0, H/100.0)
sigma1 = [navfac_stripload(q,x1,x2,i) for i in z]
sigma2 = [boussinesq_stripload(q,x1,x2,H,i,nu) for i in z]

xlabel(u"stress")
ylabel("depth")
```

```
plot(sigma1,-z,label="navfac stripload")
plot(sigma2,-z,label="bouss. dblquad pointloads")

legend(loc=4)
print "total Navfac = %.3f psf" % (trapz(sigma1,z))
print "total Boussinesq = %.3f psf" % (trapz(sigma2,z))
```
total Navfac = 330.482 psf
total Boussinesq = 411.920 psf