amplitudes

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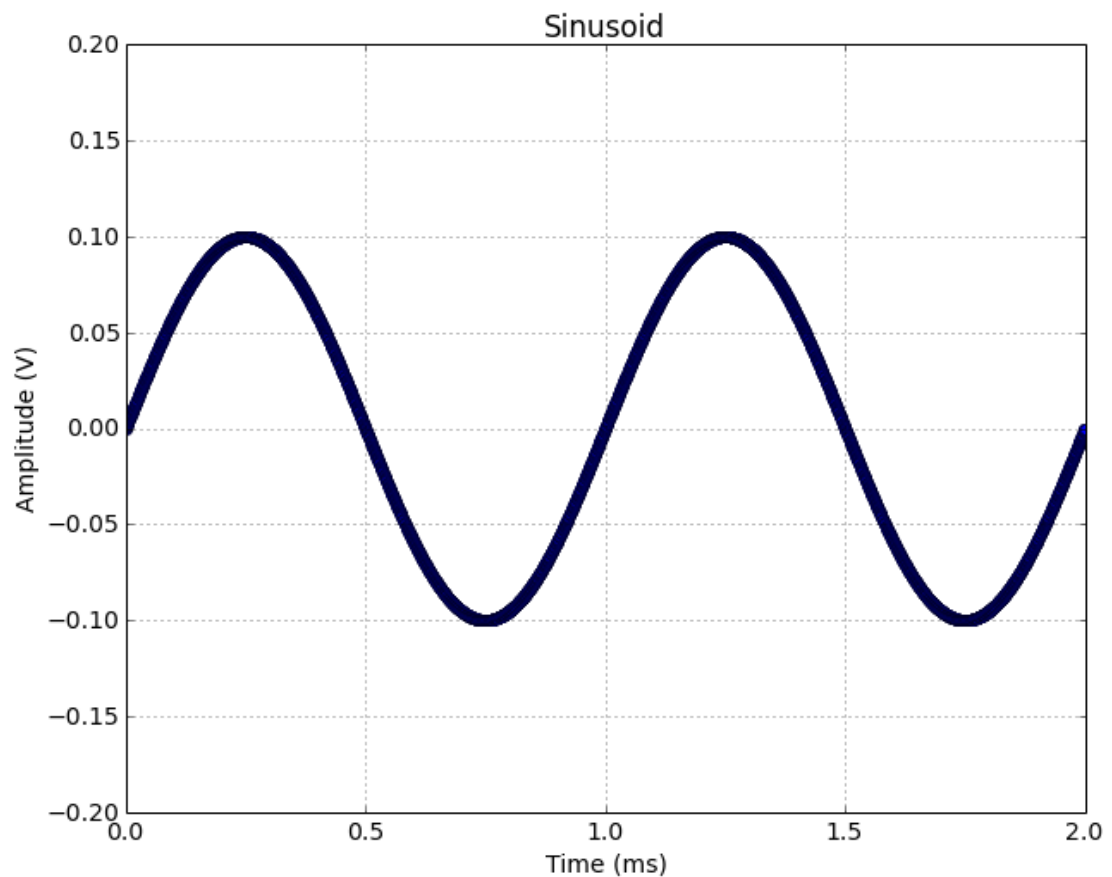
1 Pure sinusoid

In [12]:
```
t = linspace(0, 2e-3, 2**12 + 1)
a = 0.100
vsin = a * sin(2*pi*1e3*t)

plot(1e3*t, vsin, 'o')
grid('on'); ylim((-0.2, 0.2))
title('Sinusoid')
xlabel('Time (ms)'); ylabel('Amplitude (V)')
```
```
<matplotlib.text.Text at 0x3bb9150>
```

Out [12]:

```
In [13]:   def measure(v):
               print 'Vmax, Vmin:', v.max(), v.min()
               print 'V RMS (calculated):', sqrt((v**2).mean())
```

```
In [14]:   measure(vsin)
```
```
Vmax, Vmin: 0.1 -0.1
V RMS (calculated): 0.0707020480243
```

```
In [15]:   print 'V RMS (analog):    ', a/sqrt(2)
```
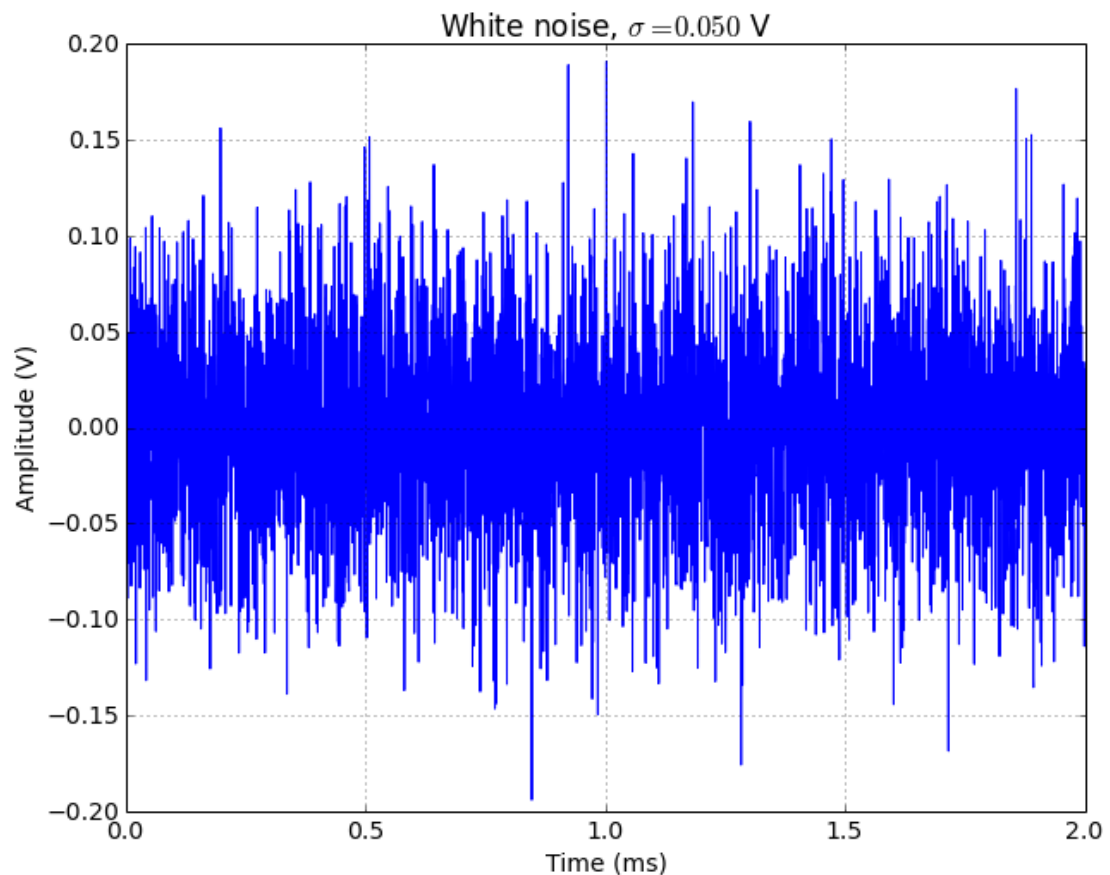```
V RMS (analog):   0.0707106781187
```

## 2  Sinusoid with noise

```
In [16]:   n_std = 0.050
           noise = n_std * randn(*t.shape)

           plot(1e3*t, noise, '-')
           grid('on'); ylim((-0.2, 0.2))
           title('White noise, $\sigma = %.3f$ V' % n_std)
           xlabel('Time (ms)'); ylabel('Amplitude (V)')
```
```
<matplotlib.text.Text at 0x36f7dd0>
```

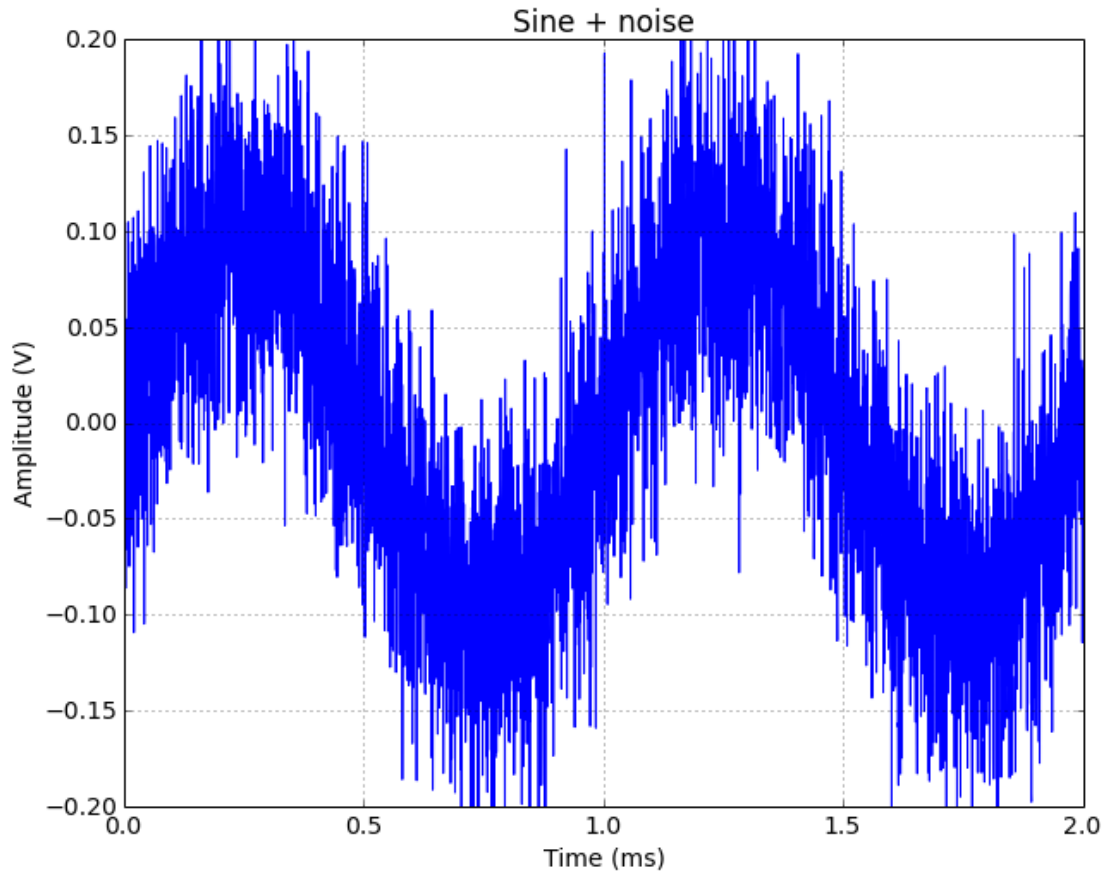Out [16]:



```
In [17]:   vnoisy = vsin + noise

           plot(1e3*t, vnoisy, '-')
           grid('on'); ylim((-0.2, 0.2))
           title('Sine + noise')
           xlabel('Time (ms)'); ylabel('Amplitude (V)')
```

<matplotlib.text.Text at 0x491ad10>

Out [17]:

Sine + noise

In [18]:
```
measure(noise)
```
Vmax, Vmin: 0.19090682972 -0.194157233698
V RMS (calculated): 0.0497700103663

In [19]:
```
measure(vnoisy)
```
Vmax, Vmin: 0.261064822875 -0.276091985706
V RMS (calculated): 0.0864462766224

```python
print 'V RMS (analog):    ', sqrt((a/sqrt(2))**2 + n_std**2)
```

In [ ]:

In [ ]:

In [ ]: