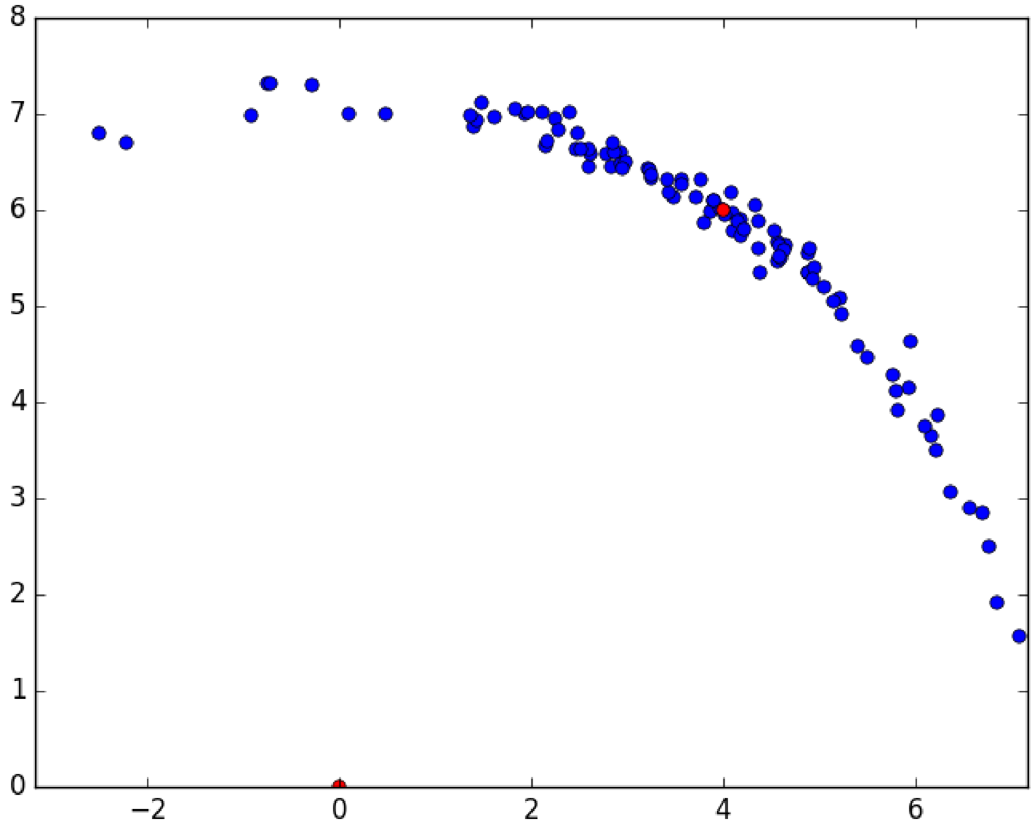
# odomSampler

```
import matplotlib.pyplot as plt
```

```
class sampleFromGaussian:
    """A Class for sampling from a gaussian normal distribution"""

    def sample(self, mu, sigma):
        tmp = [(random() * 2.0 * sigma - sigma) for x in range(12)]
        return 0.5 * sum(tmp) + mu
```

```
class sampleFromOdom:
    """A Class for sampling from an odom diff model"""

    def __init__(self, odom0 = [1, 2, pi/3], odom1 = [4, 6, pi/2], pose0 = [8, 9, pi]):
        self.sampler = sampleFromGaussian()
        self.odom0 = odom0
        self.odom1 = odom1
        self.pose0 = pose0
        # d[...] difference
        self.dRot1 = float(atan2(odom1[1] - odom0[1],odom1[0] - odom0[0]))
        self.dTrans = float(sqrt((odom1[0] - odom0[0])^2 + (odom1[1] - odom0[1])^2))
        self.dRot2 = odom1[2] - odom0[2] - self.dRot1
        # a[...] alpha
        self.a1 = 0.3
        self.a2 = 0
        self.a3 = 0.002
        self.a4 = 0


    def sample(self):
        # s[...] sample
        sRot1 = self.dRot1 - self.sampler.sample(0, self.a1 * self.dRot1^2 + self.a2 * self.dTrans^2)
        sTrans = self.dTrans - self.sampler.sample(0, self.a3 * self.dTrans^2 + self.a4 * self.dRot1^2 +
self.a4 * self.dRot2^2)
        sRot2 = self.dRot2 - self.sampler.sample(0, self.a1 * self.dRot2^2 + self.a2 * self.dTrans^2)
        pose1 = copy(self.pose0)
        pose1[0] += sTrans * cos(self.pose0[2] + sRot1)
        pose1[1] += sTrans * sin(self.pose0[2] + sRot1)
        pose1[2] += sRot1 + sRot2

        return pose1
```

```
n = 100
sampler = sampleFromOdom(odom0 = [0, 0, 0], odom1 = [4, 6, pi/2], pose0 = [0, 0, 0])
sampleSet = []
x = []
y = []
p = []
for i in range(n):
    sampleSet.append(sampler.sample())
    x.append(sampleSet[i][0])
    y.append(sampleSet[i][1])
    p.append(sampleSet[i][2])


plt.plot(x,y,'bo')
plt.plot([0, 4],[0, 6],'ro')
plt.axes().set_aspect('equal', 'datalim')
plt.savefig('Histogram.png') #matplotlib has a bug, these lines force the plot to actually be drawn
plt.close()
```


8
7
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