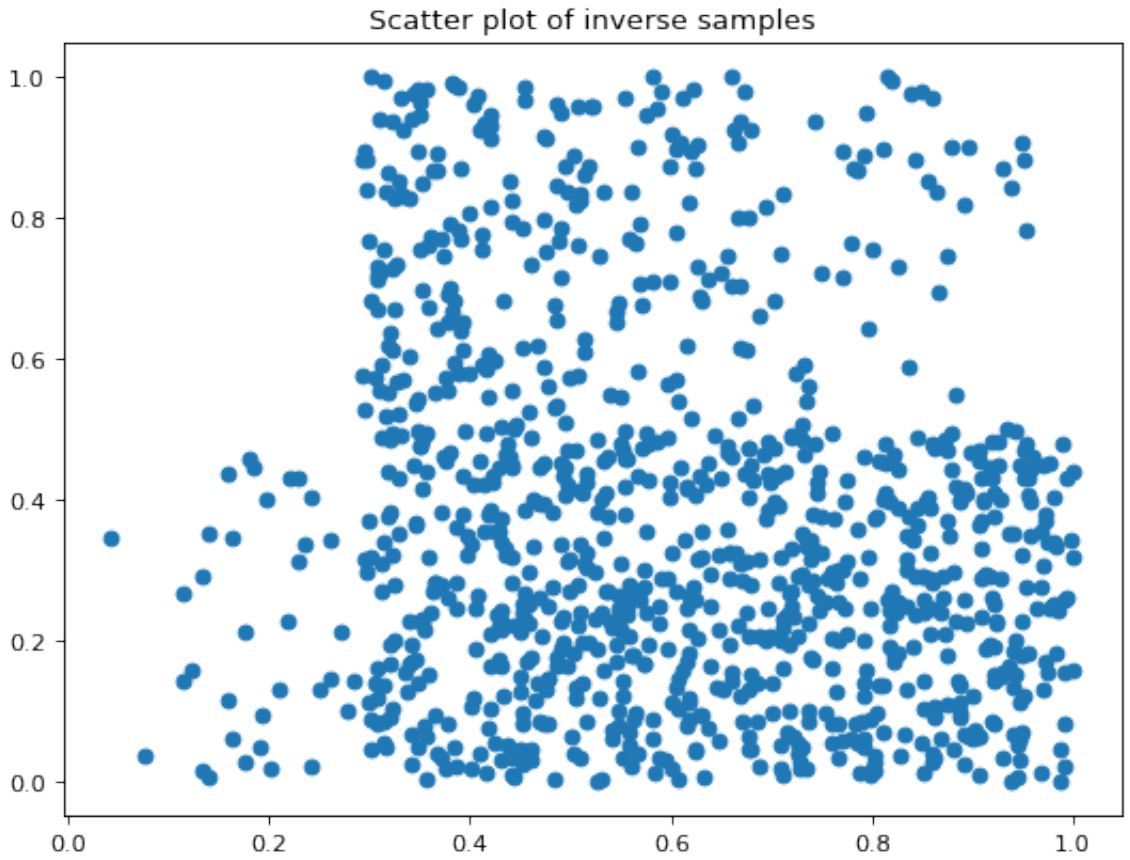
In [1]:
```
import math
import matplotlib.pyplot as plt
import numpy as np
```

In [2]:
```
def a1_inverse(u):
    return u/2

def a2_inverse(u):
    return u

def b1_inverse(v):
    return np.sqrt(v)

def b2_inverse(v):
    return (1-np.sqrt((1-v)/2))
```

In [3]:
```
u = [np.random.random() for i in range(1000)]
v = [np.random.random() for i in range(1000)]
```

In [4]:
```
#Varying the proportion of a1,b1, and a2, b2 through N
N=500
a1 = [a1_inverse(i) for i in u[:N]]
a2 = [a2_inverse(i) for i in u[N:]]
a = a1+a2
b1 = [b1_inverse(i) for i in v[:N]]
b2 = [b2_inverse(i) for i in v[N:]]
b = b1+b2

plt.figure(figsize=(8, 6), dpi=80)
plt.title("Scatter plot of inverse samples")
plt.scatter(b,a)
```

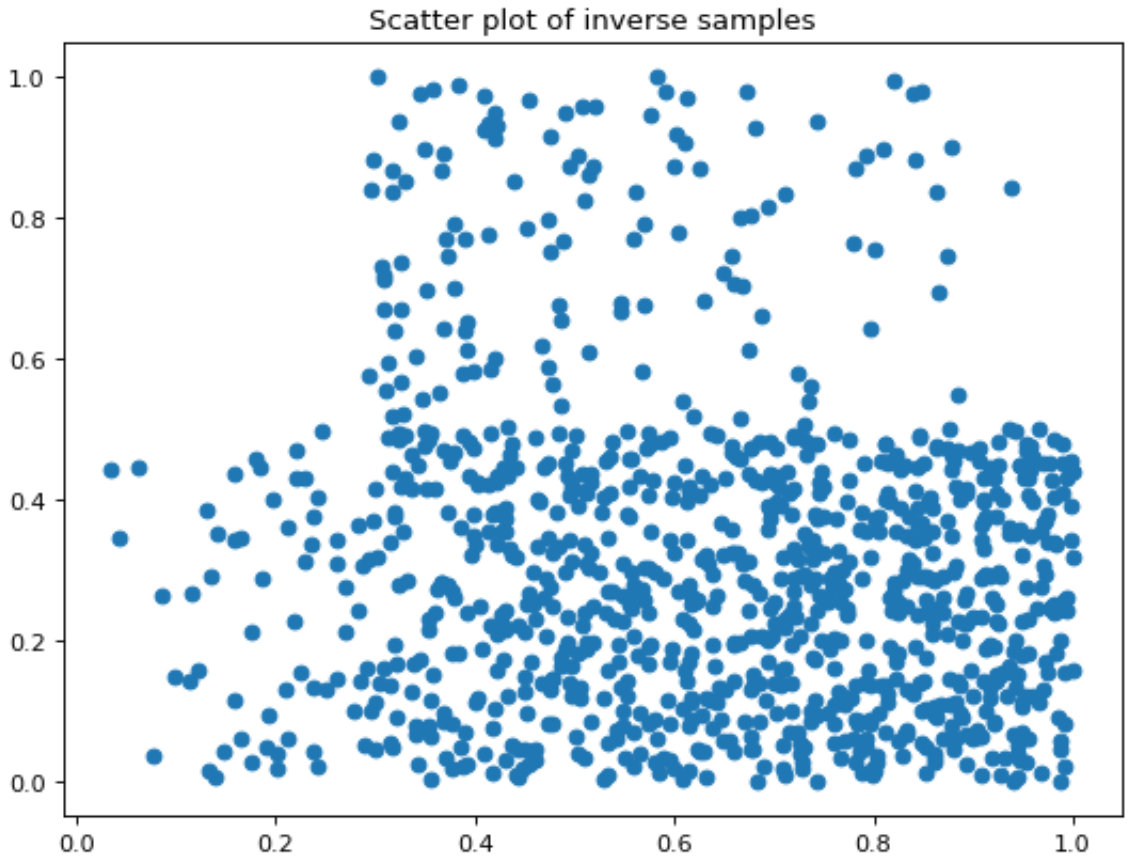
Out[4]: <matplotlib.collections.PathCollection at 0x119350ee0>



In [5]:

```
#Varying the proportion of a1,b1, and a2, b2 through N
N=750
a1 = [a1_inverse(i) for i in u[:N]]
a2 = [a2_inverse(i) for i in u[N:]]
a = a1+a2
b1 = [b1_inverse(i) for i in v[:N]]
b2 = [b2_inverse(i) for i in v[N:]]
b = b1+b2

plt.figure(figsize=(8, 6), dpi=80)
plt.title("Scatter plot of inverse samples")
plt.scatter(b,a)
```

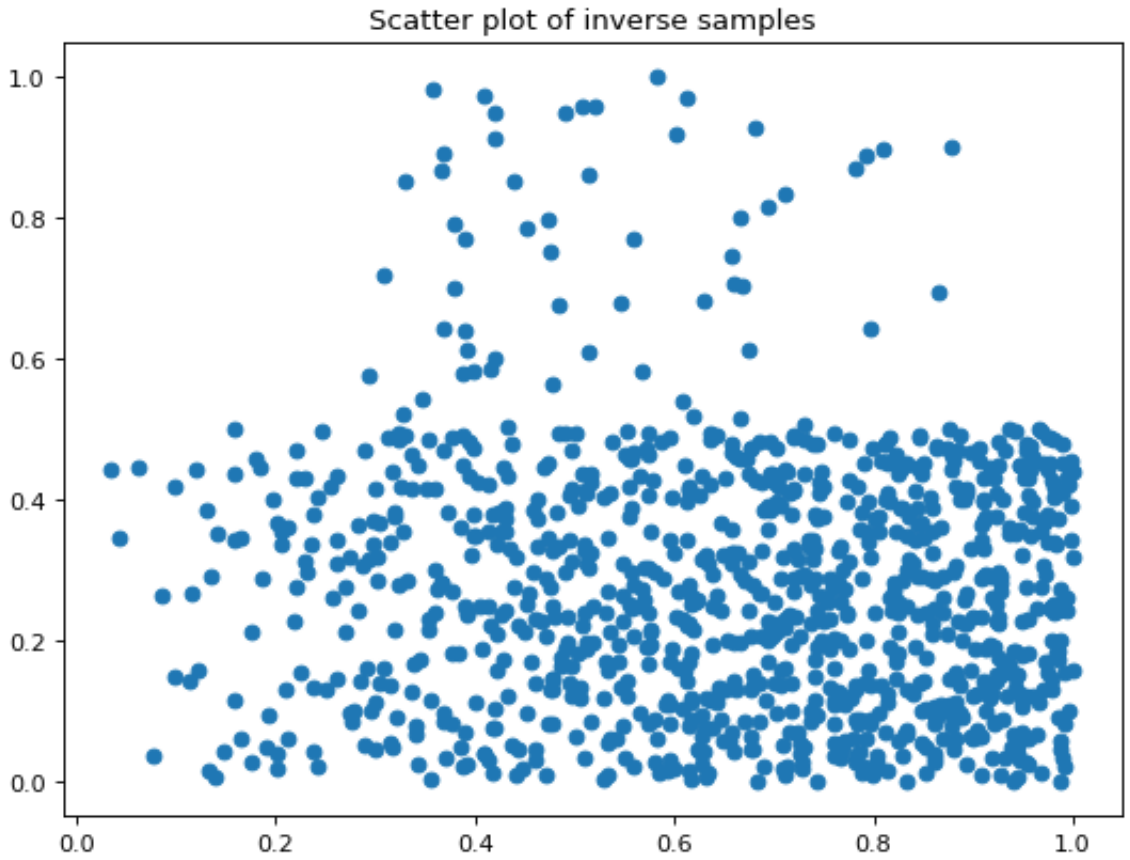
Out[5]: <matplotlib.collections.PathCollection at 0x119432b50>



In [6]:

```
#Varying the proportion of a1,b1, and a2, b2 through N
N=900
a1 = [a1_inverse(i) for i in u[:N]]
a2 = [a2_inverse(i) for i in u[N:]]
a = a1+a2
b1 = [b1_inverse(i) for i in v[:N]]
b2 = [b2_inverse(i) for i in v[N:]]
b = b1+b2

plt.figure(figsize=(8, 6), dpi=80)
plt.title("Scatter plot of inverse samples")
plt.scatter(b,a)
```

Out[6]: <matplotlib.collections.PathCollection at 0x119419bb0>



In [7]:
```
def cdf(a,b):
    if b<0.5:
        return (2*a*b*b)
    if b>=0.5:
        return (4*a*b - (2*a*b*b) - a)
```

In [8]:
```
#Looking at the joint CDF that we wanted to model
a_ = np.arange(0,1,0.0005)
b_ = np.arange(0,1,0.0005)
y_ = [cdf(a_[i], b_[i]) for i in range(len(a_))]


fig = plt.figure(figsize=(10, 8), dpi=80)
ax = fig.add_subplot(projection='3d')
ax.scatter(b_, a_, y_)
```

Out[8]: <mpl_toolkits.mplot3d.art3d.Path3DCollection at 0x11955ba60>