

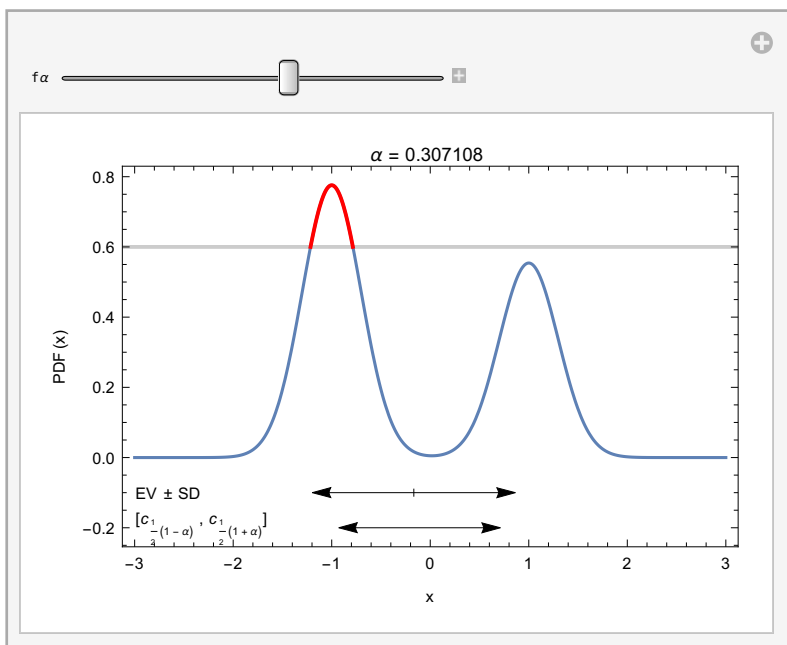
```

In[1]:= dist = MixtureDistribution[{0.7, 0.5},
    {NormalDistribution[-1, 0.3], NormalDistribution[1, 0.3]};

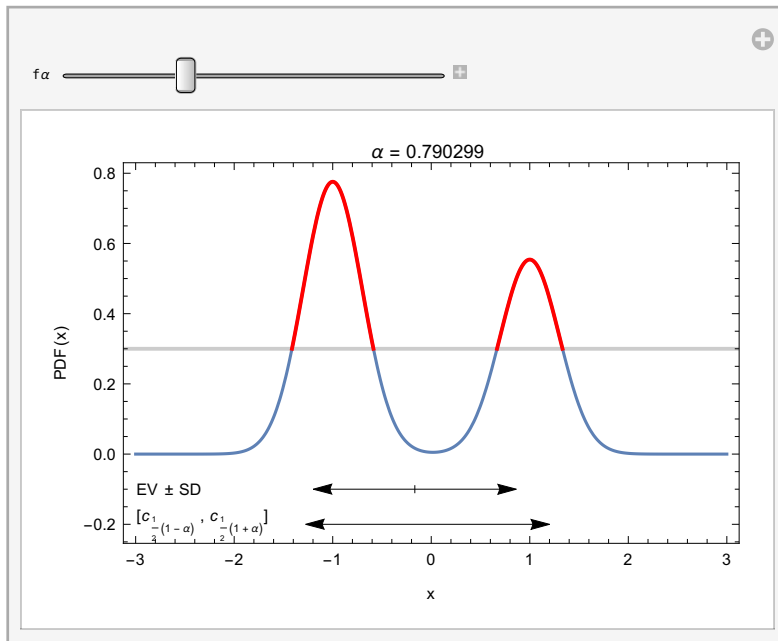
In[2]:= Manipulate[
Module[{α, ev, sd, c125, c875},
α = Integrate[If[PDF[dist][x] > fα, PDF[dist][x], 0], {x, -∞, ∞}];
ev = Mean[dist];
sd = StandardDeviation[dist];
c125 = InverseCDF[dist, 0.5 (1.0 - α)];
c875 = InverseCDF[dist, 1 - 0.5 (1.0 - α)];
Show[Plot[PDF[dist][x], {x, -3, 3}, PlotRange → All,
    Axes → False, Frame → True, FrameLabel → {"x", "PDF(x)"},
    GridLines → {None, {{fα, Thick}}}, PlotLabel → "α = " <> ToString[α], Plot[
    If[PDF[dist][x] > fα, PDF[dist][x], None], {x, -3, 3}, PlotStyle → {Thick, Red}],
Graphics[{{Arrowheads[{-0.03, 0.03}], Arrow[{{ev - sd, -0.1}, {ev + sd, -0.1}]}},
    {Line[{{ev, -0.1 - 0.01}, {ev, -0.1 + 0.01}]}},
    {Text["EV ± SD", {-3 + 0.01, -0.1}, {-1, 0}]}},
Graphics[{{Arrowheads[{-0.03, 0.03}], Arrow[{{c125, -0.2}, {c875, -0.2}]}},
    {Text["[c1/2(1-α), c1/2(1+α)]", {-3 + 0.01, -0.2}, {-1, 0}]}]}], {{fα, 0.6}, 0.0,
1.0}]

```

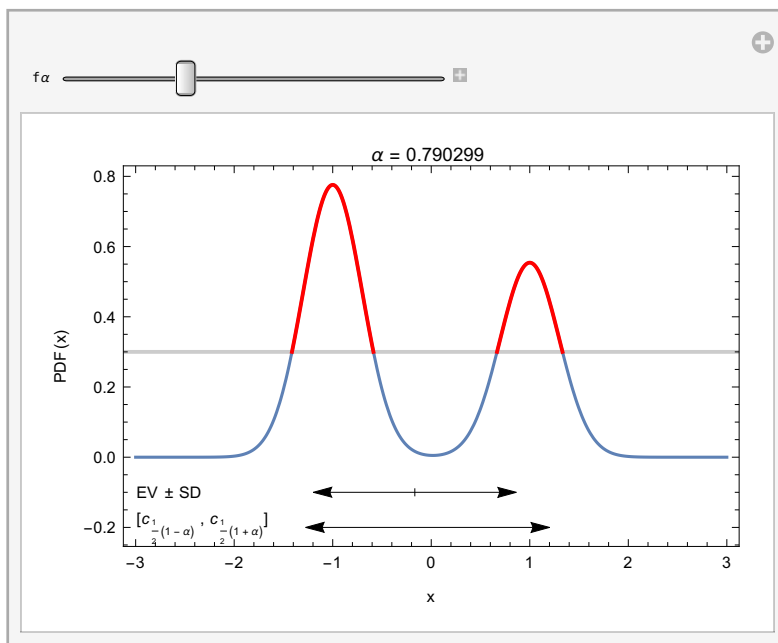
Out[2]=



In[3]:=



Out[3]=

In[4]:= **b = 10 000;**In[5]:= **n = 10;**In[6]:= **dist1 = NormalDistribution[0, 1];**In[7]:= **Mean[dist1]**

Out[7]= 0

```
In[8]:= StandardDeviation [dist1]
```

```
Out[8]= 1
```

```
In[9]:= sample = Table[RandomVariate [dist1 , n] , {b}];
```

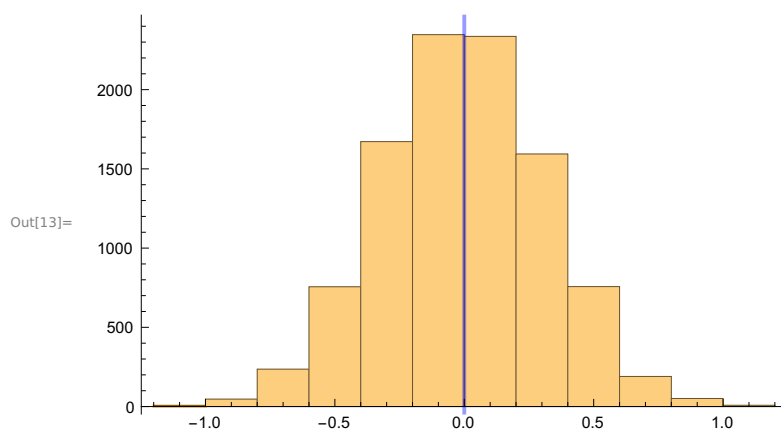
```
In[10]:= sample // Dimensions
```

```
Out[10]= {10 000 , 10}
```

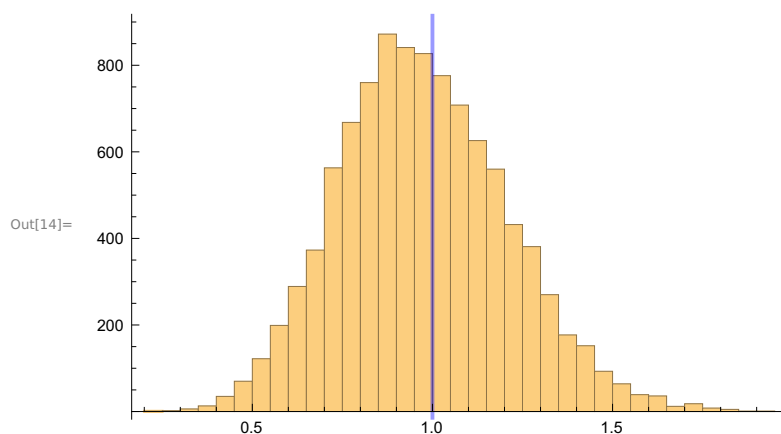
```
In[11]:= means = Mean /@ sample ;
```

```
In[12]:= stdvs = StandardDeviation /@ sample ;
```

```
In[13]:= Histogram[means , GridLines → {{{Mean[dist1] , {Thick , Blue}}}, None},  
Method → {"GridLinesInFront " → True}]
```



```
In[14]:= Histogram[stdvs , GridLines → {{{StandardDeviation [dist1] , {Thick , Blue}}}, None},  
Method → {"GridLinesInFront " → True}]
```



```
In[15]:= bsam = RandomVariate [dist1 , n]
```

```
Out[15]= {0.986179 , -0.38424 , -0.909468 , 0.41435 ,  
0.54963 , 2.29503 , -0.849731 , 3.74854 , -1.61762 , -0.775138}
```

```
In[16]:= bsample = Table[RandomChoice [bsam , n] , {b}];
```

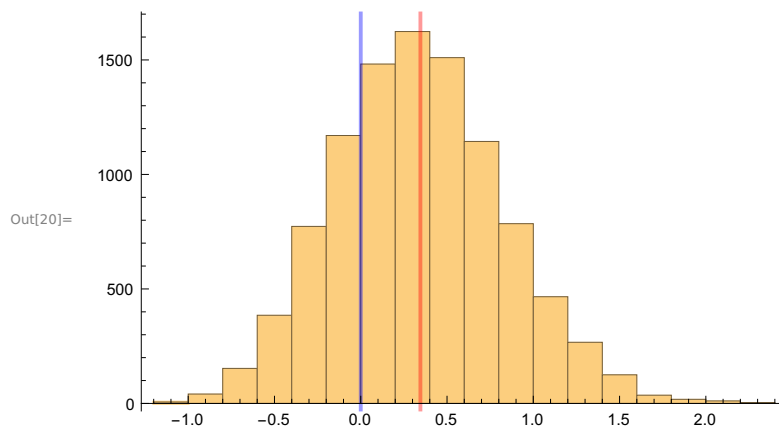
```
In[17]:= bsample // Dimensions
```

```
Out[17]:= {10 000, 10}
```

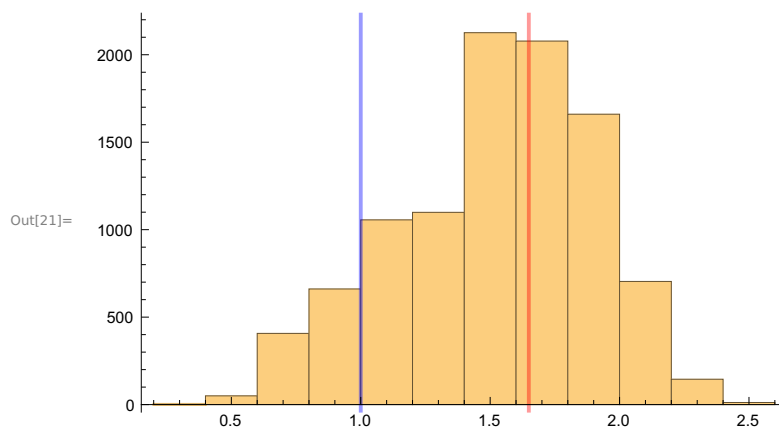
```
In[18]:= bmeans = Mean /@ bsample;
```

```
In[19]:= bstdvs = StandardDeviation /@ bsample;
```

```
In[20]:= Histogram[bmeans ,
  GridLines → {{{Mean[dist1], {Thick , Blue}}, {Mean[bsam], {Thick , Red}}}, None},
  Method → {"GridLinesInFront " → True}]
```



```
In[21]:= Histogram[bstdvs ,
  GridLines → {{{StandardDeviation [dist1], {Thick , Blue}}, {StandardDeviation [bsam],
    {Thick , Red}}}, None}, Method → {"GridLinesInFront " → True}]
```



```
In[22]:= StandardDeviation [means]
```

```
Out[22]:= 0.314227
```

```
In[23]:= StandardDeviation [bmeans]
```

```
Out[23]:= 0.48838
```

```
In[24]:= StandardDeviation [stdvs]
```

```
Out[24]:= 0.233923
```

```
In[25]:= StandardDeviation [bstdvs]  
Out[25]= 0.379122
```