

(\* BIOEN 3070/6070: Introduction to Statistics for Bioengineers \*)

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(\* Table 13 in Bulmer (Dover 1979), p.95 \*)

(\* In-Class Project 4: Bhattacharyya Coefficient Measure \*)

(\* Chi-Squared Test of Goodness of Fit \*)

```
e = {139, 97, 34, 8, 1};
o = {144, 91, 32, 11, 2};
chi = N[Sum[(o[[a]] - e[[a]])^2 / e[[a]], {a, 1, Dimensions[o][[1]]}]]
2.79364
```

```
CDF[ChiSquareDistribution[4], chi]
pValue = 1 - CDF[ChiSquareDistribution[4], chi]
If[pValue < 0.05, "Not Likely", "Not Not Likely"]
0.407068
0.592932
Not Not Likely
```

(\* Bhattacharyya Coefficient Measure \*)

```
e = {139, 97, 34, 8, 1};
eFrequency = e / Sum[e[[a]], {a, 1, Dimensions[e][[1]]}]
o = {144, 91, 32, 11, 2};
oFrequency = o / Sum[o[[a]], {a, 1, Dimensions[o][[1]]}]
{ 139  97  34  8  1
  279  279  279  279  279 }
{ 18  13  4  11  1
  35  40  35  280  140 }
bhattacharyya = N[Sum[Sqrt[oFrequency[[a]] * eFrequency[[a]]], {a, 1, Dimensions[o][[1]]}]]
1 - bhattacharyya
If[1 - bhattacharyya < 0.05, "Similar", "Dissimilar"]
0.998964
0.00103626
Similar
```