A Note on Bhattacharyya coefficient, Bhattacharyya distance, Mahalanobis distance, Hellinger distance and Kullback-Leibler divergence

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Bhattacharyaa distance conveys the notion of similarity between two probability distributions.

**Definition**: *Bhattacharyaa coefficient ()*

For *discrete* probability distributions the *Bhattacharyaa coefficient* is calculated as the sum of square roots of the product of the probabilities for each corresponding outcome in the two distributions

(1)

where the summation is over all possible outcomes in the domain .

For continuous probability distributions the summation is replaced by integral. Thus we arrive at

(2)

where the integral (2) is taken over the entire range/domain of .

**Definition**: *Bhattacharyaa distance ()*

**Definition**: *Mahalanobis distance ()*

**Definition**: *Hellinger distance ()*

**Definition**: *Kullback-Leibler divergence ()*

# References

[1] [Bhattacharyaa distance, Wikipedia](https://en.wikipedia.org/wiki/Bhattacharyya_distance)

[2] [Mahalanobis distance, Wikipedia](https://en.wikipedia.org/wiki/Mahalanobis_distance)

[3] [Hellinger distance, Wikipedia](https://en.wikipedia.org/wiki/Hellinger_distance)

[4] [Kullback-Leibler divergence, Wikipedia](https://en.wikipedia.org/wiki/Kullback%E2%80%93Leibler_divergence)

[5] -finite Measure, Wikipedia

# Appendix

## -finite Measure