# Tabular Data:

**MA 323 - Monte Carlo Simulation Assignment - 10**

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|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **M** |  | **95% confidence level for**  **(Length = a)** |  | **95% confidence level for**  **(Length = b)** | **Ratio of length of both intervals (a/b)** |
| 102 | 1.9530628367840035 | [1.863981446763257, 2.04214422680475] | 1.9986463476134089 | [1.992488264044228, 2.0048044311825897] | 14.4658 |
| 103 | 1.9847265706875816 | [1.9570516696541143, 2.012401471721049] | 1.9995305635503724 | [1.9975513498703716, 2.0015097772303734] | 13.9828 |
| 104 | 1.9914061973071622 | [1.9827862602887094, 2.0000261343256147] | 2.000289999955245 | [1.9996547521285561, 2.0009252477819337] | 13.5694 |
| 105 | 1.9992837551561167 | [1.9965529966352606, 2.0020145136769725] | 2.000121925755008 | [1.9999198410156243, 2.000324010494391] | 13.5129 |

# Observations:

|  |  |  |
| --- | --- | --- |
| **M** | **Variance of I using Monte Carlo Estimator** | **Variance of I using Antithetic Estimator** |
| 102 | 0.20657501273421114 | 0.000987176877719643 |
| 103 | 0.19937741961107822 | 0.001019739368283723 |
| 104 | 0.19342473177589758 | 0.0010504858184052792 |
| 105 | 0.19412005821996686 | 0.0010630920126407884 |

1. The converges to the value of 2 as M increases. Similar nature is observed for the value of .

2. Both and  values are almost same and the absolute difference between them decreases as M increases.

3. The variance is greatly reduced when the Antithetic Estimator is used, which is quite evident from the table above.