DEPARTMENT OF MATHEMATICS TECHNICAL REPORT

VARIOUS ESTIMATIONS OF π AS DEMONSTRATIONS OF THE MONTE CARLO METHOD

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 $Ja\,$ $\acute{v}\,e\,$ $McC\,$ ea \cdot De_1 $a \cdot$ $e \cdot \rightarrow$ Ma e at c Te e ee Tec_{nolog}ica, University C_{τ} e i, e, TN 38505 U de e e e i $h_{\mathbf{r}}$ D. Micae, A , e $\mathcal{F}\circ\mathcal{F}\circ\mathcal{D}\circ\mathcal{F}\circ\mathcal{C}\circ\mathcal{C}\circ\mathcal{C}\circ\mathcal{C}\circ\mathcal{D}\circ\mathcal{C}\circ\mathcal{C}\circ\mathcal{D}\circ\mathcal{C}\circ\mathcal{C}\circ\mathcal{C}\circ\mathcal{C}\circ\mathcal{C}\circ\mathcal{C}\circ\mathcal{C}\circ\mathcal{C}\circ\mathcal{C}\circ\mathcal{C}\circ\mathcal{C}\circ\mathcal{C}\circ\mathcal{C}\circ\mathcal{C}\circ\mathcal{C}\circ\mathcal{C}\circ\mathcal{C}\circ\mathcal{C}\circ\mathcal{C}\circ\mathcal$ **2.** π τ first theoretical calculations of π appear to have been made by the by the have been made by the by the by the π $\begin{array}{c} \bigoplus_{\pi} f_{\pi} \longrightarrow \mathbb{R} \ (287-212 \text{ BC}). \mathbb{A} \rightarrow \mathbb{R} \end{array}$ π $223/71$ and $22/7$. He used in \mathcal{N}_f polygons. Letting the number of sides of the polygons increase until he had polygons with \mathcal{P} sides. Archimedes noted that as he increased that as he increased that as \mathcal{P} of sides, the semiperimeter of the inscription \mathcal{Y} the inscription \mathcal{Y} \mathcal{P}_q , while the semiperimeter of the ascribed polygon for the ascribed polygon formed a decreasing \mathcal{P}_q $s_{\rm eff}$ sether noted that both sequences that both sequences that both sequences then had a limit of π T_{th} is $\lambda \pi$ in λ accomplished until λ 400 years later, $\frac{1}{4}$ $\frac{1}{\mathbb{P}}$ around $\frac{1}{\mathbb{P}}$ by P_{tole}my was able to $\frac{\pi}{3}$. \mathbf{F} , \mathbf{P} of λ century to \mathbf{C} in the early λ calculated λ calculated π $\frac{1}{2}$ 35 decimal places, there was little in Archimedes techniques technique, there is $\frac{1}{2}$ $\partial_t \Lambda$ increases that the calculations in calculations. It was during the calculations. It was during the calculations of Λ latter portion of the 15th century that renewed interest interest interest in the calculation of μ π brought about improved mathematical techniques by mathematical techniques by λ

1

 π

$t_{\rm eff}$, and the points that within a radius of q from the square of the squa and thus formed an inscribed circle. This is shown in Figure 3.1.

 $\hat{P}_{\rm QCD}(\hat{Y}_{\rm s})$

 N ext, if we take a ratio of the area of the area of the square of we get:

$$
A_c/A_s = \frac{\pi \theta^2}{4\theta^2}
$$

$$
\Rightarrow \pi = 4(A_c/A_s)
$$
\n
\n
$$
\
$$

 3.2

random number generator in the software package. The better the package was in generating a random scatter of points, the more accurate our estimate our estimate our estimate our est was.

$$
\mathbf{y} = \begin{bmatrix} \mathbf{y} & \mathbf{y} & \mathbf{y} & \mathbf{y} & \mathbf{y} & \mathbf{y} \\ \mathbf{y} & \mathbf{y} & \mathbf{y} & \mathbf{y} & \mathbf{z} & \mathbf{z} & \mathbf{z} \\ \mathbf{y} & \mathbf{y} & \mathbf{y} & \mathbf{y} & \mathbf{z} & \mathbf{z} & \mathbf{z} \\ \mathbf{y} & \mathbf{y} & \mathbf{y} & \mathbf{z} & \mathbf{z} & \mathbf{z} & \mathbf{z} \\ \mathbf{y} & \mathbf{y} & \mathbf{z} & \mathbf{z} & \mathbf{z} & \mathbf{z} & \mathbf{z} \\ \mathbf{y} & \mathbf{z} & \mathbf{z} & \mathbf{z} & \mathbf{z} & \mathbf{z} & \mathbf{z} \\ \mathbf{y} & \mathbf{z} & \mathbf{z} & \mathbf{z} & \mathbf{z} & \mathbf{z} & \mathbf{z} \\ \mathbf{y} & \mathbf{z} \\ \mathbf{y} & \mathbf{z} \\ \mathbf{z} & \mathbf{z} \\ \mathbf{z} & \mathbf{z} \\ \mathbf{z} & \mathbf{z} \\ \mathbf{z} & \mathbf{z} \\ \mathbf{z} & \mathbf{z
$$

 $I_n \approx \sqrt{2\pi}$ Therefore, we simply solve the value of our algorithm for π , π , π , π gives us:

$$
\pi \approx \frac{I_n^2}{2}
$$

 $\begin{array}{|c|c|c|}\n\hline\n& 3.3 & \text{f} \\
\hline\n-\end{array}$

