UNIVERSIDAD DEL BÍO-BÍO
FACULTAD DE CIENCIAS EMPRESARIALES

Algorithms and Applications
Heterogeneous Computing

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Content

1. Algorithm to calculate Pi

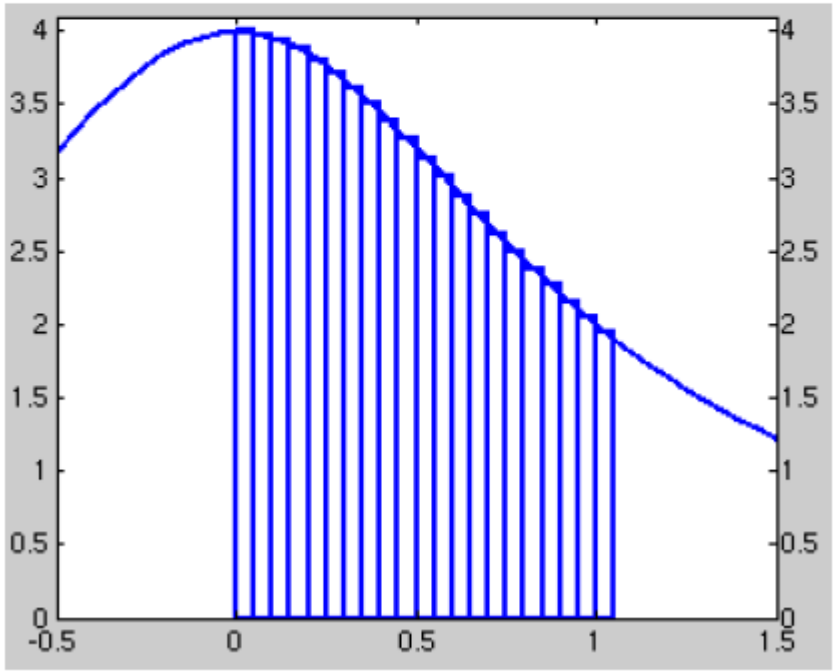
Pi

- Sequential version

```
double f(double x) {
    return (4.0 / (1.0 + x*x));
}

double CalcPi (int n) {
    const double fH = 1.0 / (double) n;
    double fSum = 0.0;
    double fX;
    int i;
    for (i = 0; i < n; i++) {
        fX = fH * ((double)i + 0.5);
        fSum += f(fX);
    }
    return fH * fSum;
}
```

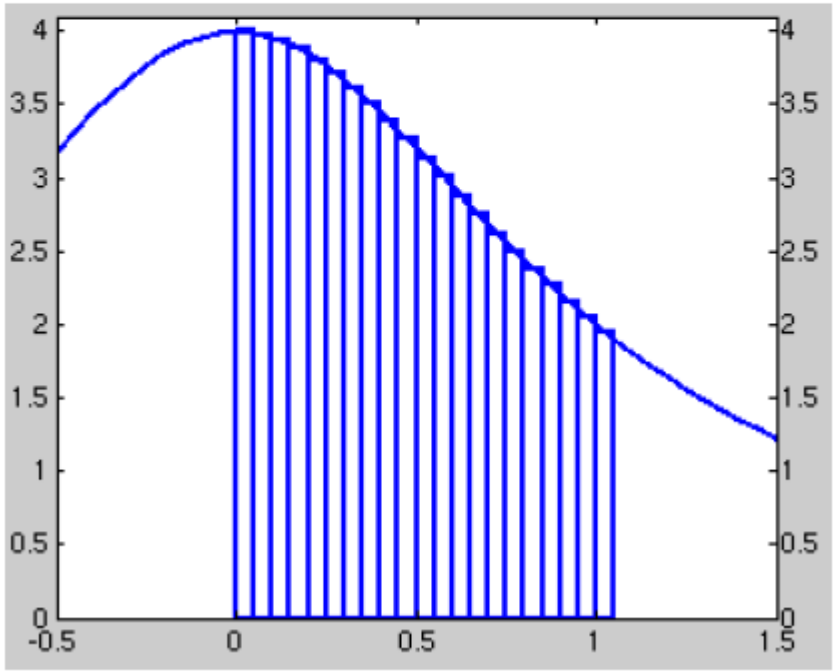
$$\pi = \int_0^1 \frac{4}{1+x^2}$$



Pi

- Parallel version in DPC++ using map and reduction

$$\pi = \int_0^1 \frac{4}{1+x^2}$$



References

- Intel Corp. Training for OneAPI https://www.intel.com/content/www/us/en/developer/tools/oneapi/training/overview.html
- Reinders, J., Ashbaugh, B., Brodman, J., Kinsner, M., Pennycook, J., & Tian, X. (2021). Data Parallel C++: Mastering DPC++ for Programming of Heterogeneous Systems using C++ and SYCL (p. 548). Springer Nature.