

Computational Physics Lab

Numerical Integration

04/16/2009

Outline

1 Numerical Integration

Numerical Integration

```
class IntegralCalculator {  
  
    public:  
        IntegralCalculator (double aIntegrandFunction (double));  
        void integrate();  
        void readInputData();  
        void print();  
  
    private:  
        int iNumberOfIntervals;  
        double iLeftLimit, iRightLimit, iError, iResult;  
        double (*iIntegrandFunction) (double);  
};
```

Numerical Integration

```
class IntegralCalculator {  
    public:  
        IntegralCalculator (double aIntegrandFunction (double));  
        void integrate();  
        ...  
    private:  
        double (*iIntegrandFunction) (double);  
        ...  
}
```

Numerical Integration

```
class IntegralCalculator {  
    public:  
        IntegralCalculator (double aIntegrandFunction (double));  
        void integrate();  
        ...  
    private:  
        double (*iIntegrandFunction) (double);  
        ...  
}
```

```
int main() {  
    IntegralCalculator IC1(myFunction);  
    IC1.readInputData();  
    IC1.integrate();  
    IC1.print();  
}
```

Numerical Integration

```
class IntegralCalculator {  
    public:  
        IntegralCalculator (double aIntegrandFunction (double));  
        void integrate();  
        ...  
    private:  
        double (*iIntegrandFunction) (double);  
        ...  
}
```

```
double myFunction(double aX)  
{  
    return ...  
}
```

```
int main() {  
    IntegralCalculator IC1(myFunction);  
    IC1.readInputData();  
    IC1.integrate();  
    IC1.print();  
}
```

Numerical Integration

```
class IntegralCalculator {  
    public:  
        IntegralCalculator (double aIntegrandFunction (double)) {  
            iIntegrandFunction = aIntegrandFunction;  
        };  
        ...  
    private:  
        double (*iIntegrandFunction) (double);  
        ...  
}
```

```
double myFunction(double aX)  
{  
    return ...  
}
```

```
int main() {  
    IntegralCalculator IC1(myFunction);  
    IC1.readInputData();  
    IC1.integrate();  
    IC1.print();  
}
```