Universidade Eduardo Mondlane

Faculdade de ciências

Departamento de Matemática e informática

Curso: Informática

III º Nível 2023

Disciplina: Analise Numérica

Tema: Método de Simpson

Discentes:

Elidio Ernesto Magule

Milagre António Chavanguane
Nelson Alexandre Matsinhe

Docente: Rossana Soares

Alfredo Muthombene

Maputo ,15 de Novembro de 2023

```
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>Método de Simpson 1/3</title>
    <style>
        body {
            font-family: Arial, sans-serif;
    margin: 0;
    padding: 0;
    display: flex;
    justify-content: center;
    align-items: center;
    min-height: 100vh;
    background-color: #f0f0f0;
        }

        h1 {
            margin-top: 30px;
            text-align: center;
            padding-top:20px ;
            padding-bottom:20px ;
        }

        table {
            border-collapse: collapse;
            margin: 0 auto;
        }


        .input-container {
      display: flex;
      justify-content: space-between;
    }

    .a {
      position: relative;
      top: 25px;
      left: 14px;
      margin: 4px;
      margin-top: 10px;
    }

    .btn-download {
```

```
  display: inline-block;
  padding: 10px 20px;
  text-decoration: none;
  background-color: #3498db;
  color: white;
  border-radius: 5px;
  font-family: Arial, sans-serif;
  margin: auto;
  height: 30px;
  width: 90px;
  align-items: center;
}


/* Efeitos quando o cursor passa por cima do botão */
.btn-download:hover {
  background-color: #2980b9;
}
    .b {
      position: relative;
      top: -40px;
      left: -90px;
      margin: 5px;
    }

    .funcao {
     padding-top: 20px;
      margin-top: 70px;
      align-content: center;
      margin: auto;
      height: 30px;
      width: 380px;
    }
        th, td {
            border: 1px solid #cccccc;
            padding: 18px;
            text-align: center;
        }

        th {
            background-color: #f0f0f0;
            width: 60px;
        }

        p {
```

```
            font-weight: bold;
            text-align: center;

        }

        input[type="number"] {
            width: 60px;
        }

        button {
    background-color: #007bff;
    color: #fff;
    border: none;
    cursor: pointer;
    transition: background-color 0.3s;
    align-items: center;
    margin: auto;
    width: 190px;
    height: 40px;
}
        .integral-icon {
            font-size: 50px;
            margin: 10px 0;
            position: relative;
            margin-bottom: 10px;
            height: 60px;
            width: 10px;
            left: -90px;
        }

.intervalo{

    height: 40px;
    width: 400px;
    margin: auto;
    margin-top: 35px;

}
        .input-container {
            display: flex;
            justify-content: center;
            align-items: center;
            left: 100px;
        }
```

```
        .botao{

            margin: auto;
            height: 5px;
            width: 150px;
            margin-bottom: 40px;

        }
        .limits {
            font-weight: bold;
            margin: 5px;
        }

        .h-value {
            font-weight: bold;
            font-size: 18px;
            margin-bottom: 10px;
            margin: auto;
        }
        .fonte{


            margin: auto;
            height: 60px;
            width: 150px;
            margin-bottom: 20px;
        }
        .container{

            background-color: #fff;
    padding: 20px;
    border-radius: 5px;
    box-shadow: 0 2px 5px rgba(0, 0, 0, 0.1);
    width: 700px;}

         .container-integral{
            margin: auto;
            height: 110px;
            left: 40px;
            margin-top: 10px;

         }

    </style>
</head>
```

```
<body>
    <div  class="container">
    <h1>Método de Simpson 1/3</h1>
    <p> codigo fonte </p>
    <div  class="fonte">

<a href="#" download="arquivo.zip" class="btn-download">Download </a>

    </div>
    <div class="container-integral">
    <div class="input-container">
        <div class="a">
            <label for="a">a:</label>
            <input type="number" id="a" step="0.01" value="1.00">
        </div>
        <div class="integral-icon">∫</div>
        <div class="b">
            <label for="b">b:</label>
            <input type="number" id="b" step="0.01" value="2.00">
        </div>
    </div>

    <div class="funcao">
        <label for="func">Função f(x):</label>
        <input type="text" id="func" placeholder="Insira a função, por exemplo: 2
* ln(x) + 3 * x^2 - 3">
    </div></div>
    <div class="intervalo">
        <label for="n">Número de subintervalos (n):</label>
        <input type="number" id="n" value="4">
    </div>
    <div class="botao">
    <button id="calculateBtn">Calcular Integral</button>

</div><p class="h-value">Valor de h: <span id="hValue"></span></p>
    <table>
        <thead>
            <tr>
                <th>I</th>
                <th>X</th>
                <th>f(x)</th>
            </tr>
        </thead>
        <tbody id="table-body">
        </tbody>
```

```
    </table>
    <p>Resultado da integral: <span id="result"></span></p>
</div>
    <script
src="https://cdnjs.cloudflare.com/ajax/libs/mathjs/11.4.0/math.js"></script>
    <script>
      function ln(x) {
  return Math.log(x);
}

document.getElementById('calculateBtn').addEventListener('click', () => {
  // Limpa a tabela e o resultado anterior
  document.getElementById('table-body').innerHTML = '';
  document.getElementById('result').textContent = '';

  const funcStr = document.getElementById('func').value;
  const a = parseFloat(document.getElementById('a').value);
  const b = parseFloat(document.getElementById('b').value);
  const n = parseInt(document.getElementById('n').value);

  // Função para a qual a integral será calculada
  const func = x => math.evaluate(funcStr, { x: x, ln: ln })

            // Valor de h com uma casa decimal
            const h = (b - a) / n;
            document.getElementById('hValue').textContent = h.toFixed(1);

            // Método de Simpson 1/3
            function simpson13(a, b, n) {
                let result = 0;
                let resulta = 0;
                let x = a;
                let oddSum = 0;
                let evenSum = 0;

                for (let i = 0; i <= n; i++) {
                    if (i == 0 || i == n)
                        resulta -= func(x);
                    if (i % 2 === 0) {
                        evenSum += func(x);
                    } else {
                        oddSum += func(x);
                    }
                    // Adiciona uma linha à tabela a cada iteração
                    const newRow = document.createElement('tr');
```

```
                    newRow.innerHTML =
`<td>${i}</td><td>${x.toFixed(1)}</td><td>${func(x).toFixed(5)}</td>`;
                    document.getElementById('table-body').appendChild(newRow);

                    x += h;
                }

                result += 4 * oddSum + 2 * evenSum + resulta;
                result *= h / 3;
                return result.toFixed(5);
            }

            const integralResult = simpson13(a, b, n);
            document.getElementById('result').textContent = integralResult;
        });
    </script>
</body>
</html>
```