

## 0.1 Derivative notations

`\usepackage{derivative}`

### 0.1.1 Ordinary derivative

```
1 \begin{align}
2   & \frac{df}{dx} \\
3   & \text{odv}\{f\}\{x\} \\
4   & \text{odv*}\{f\}\{x\} \\
5 \end{align}
```

$$\frac{df}{dx} \quad (1)$$

$$\frac{df}{dx} \quad (2)$$

$$\frac{d}{dx}f \quad (3)$$

### 0.1.2 Partial derivative

```
1 \begin{align}
2   & \frac{\partial f}{\partial x} \\
3   & \text{pdv}\{f\}\{x\} \\
4   & \text{pdv*}\{f\}\{x\} \\
5   & \text{pdv}\{f\}!\{x\} \\
6   & \text{pdv}\{f\}\{x,y\} \\
7   & \text{pdv}[order=\{2,3\}]\{f\}\{x,y,z\} \\
8 \end{align}
```

$$\frac{\partial f}{\partial x} \quad (4)$$

$$\frac{\partial f}{\partial x} \quad (5)$$

$$\frac{\partial}{\partial x}f \quad (6)$$

$$\partial_x f \quad (7)$$

$$\frac{\partial^2 f}{\partial x \partial y} \quad (8)$$

$$\frac{\partial^6 f}{\partial x^2 \partial y^3 \partial z} \quad (9)$$

### 0.1.3 Material derivative

```
1 \begin{align}
2   & \frac{Df}{Dx} \\
3   & \text{mdv}\{f\}\{x\} \\
4   & \text{mdv*}\{f\}\{x\} \\
5 \end{align}
```

$$\frac{Df}{Dx} \quad (10)$$

$$\frac{Df}{Dx} \quad (11)$$

$$\frac{D}{Dx}f \quad (12)$$

### 0.1.4 Functional derivative

```
1 \begin{align}
2   & \frac{\delta f}{\delta x} \\
3   & \text{fdv}\{f\}\{x\} \\
4   & \text{fdv*}\{f\}\{x\} \\
5 \end{align}
```

$$\frac{\delta f}{\delta x} \quad (13)$$

$$\frac{\delta f}{\delta x} \quad (14)$$

$$\frac{\delta}{\delta x}f \quad (15)$$

### 0.1.5 Average rate of change

```
1 \begin{align}
2   & \frac{\Delta f}{\Delta x} \\
3   & \text{adv}\{f\}\{x\} \\
4 \end{align}
```

$$\frac{\Delta f}{\Delta x} \quad (16)$$

$$\frac{\Delta f}{\Delta x} \quad (17)$$

### 0.1.6 Jacobian

```
1 \begin{align}
2   & \frac{
3     \partial (f, g, h)
4   }{
5     \partial (x, y, z)
6   } \\
7   & \text{\jdv{f, g, h}{x, y, z}}
8 \end{align}
```

$$\frac{\partial(f, g, h)}{\partial(x, y, z)} \quad (18)$$

$$\frac{\partial(f, g, h)}{\partial(x, y, z)} \quad (19)$$