

0.1 Derivative notations

`\usepackage{derivative}`

0.1.1 Ordinary derivative

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

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

$$\operatorname{odv}{f}{x} \quad (2)$$

$$\operatorname{odv*}{f}{x} \quad (3)$$

0.1.2 Partial derivative

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

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

$$\operatorname{pdv}{f}{x} \quad (5)$$

$$\operatorname{pdv*}{f}{x} \quad (6)$$

$$\operatorname{pdv}{f}!{x} \quad (7)$$

$$\operatorname{pdv}{f}{x,y} \quad (8)$$

$$\operatorname{pdv}[order={2,3}]{f}{x,y} \quad (9)$$

0.1.3 Material derivative

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

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

$$\operatorname{mdv}{f}{x} \quad (11)$$

$$\operatorname{mdv*}{f}{x} \quad (12)$$

0.1.4 Functional derivative

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

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

$$\operatorname{fdv}{f}{x} \quad (14)$$

$$\operatorname{fdv*}{f}{x} \quad (15)$$

0.1.5 Average rate of change

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1 \begin{align}
2   & \frac{\Delta f}{\Delta x} \\
3   & \quad \hookrightarrow \quad \frac{\Delta f}{\Delta x} \\
4 \end{align}

```

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

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

0.1.6 Jacobian

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

```

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

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