Congratulations! You passed!

TO PASS 80% or higher

Keep Learning

GRADE
100%

Assessment: Jacobians and Hessians

LATEST SUBMISSION GRADE

100%

1. In this assessment, you will be tested on all of the different topics you have in covered this module. Good luck!

1 / 1 point

Calculate the Jacobian of the function $f(x, y, z) = x^2cos(y) + e^z sin(y)$ and evaluate at the point $(x, y, z) = (\pi, \pi, 1)$.

- $J(x, y, z) = (-2\pi, e, 1)$
- $J(x, y, z) = (-2\pi, -e, 1)$
- $J(x, y, z) = (-2\pi, -e, 0)$
- $J(x, y, z) = (-2\pi, e, 0)$

Correct
Well done!

2. Calculate the Jacobian of the vector valued functions:

1 / 1 point

$u(x, y) = x^2y - cos(x)sin(y)$ and $v(x, y) = e^{x+y}$ and evaluate at the point $(0, \pi)$.

- $\begin{bmatrix} 0 & 1 \\ e^\pi & e^\pi \end{bmatrix}$
- $\begin{bmatrix} e^\pi & 1 \\ 0 & e^\pi \end{bmatrix}$
- $\begin{bmatrix} 0 & e^\pi \\ 1 & e^\pi \end{bmatrix}$
- $\begin{bmatrix} e^\pi & 1 \\ e^\pi & 0 \end{bmatrix}$

Correct
Well done!

3. Calculate the Hessian for the function $f(x, y) = x^3cos(y) - xsin(y)$.

1 / 1 point

- $H = \begin{bmatrix} 6cos(y) & -3x^2sin(y) - cos(y^2) \\ -3x^2sin(y) - cos(y) & x^2sin(y) - x^3cos(y) \end{bmatrix}$
- $H = \begin{bmatrix} 6cos(x) & -3x^2sin(y) - cos(y) \\ -3x^2sin(y) - cos(y) & xsin(y) - y^3cos(x) \end{bmatrix}$
- $H = \begin{bmatrix} 6x^2cos(y) & -3x^2sin(y) - cos(x) \\ -3x^2sin(y) - cos(y) & xsin(y) - xcos(y) \end{bmatrix}$
- $H = \begin{bmatrix} 6xcos(y) & -3x^2sin(y) - cos(y) \\ -3x^2sin(y) - cos(y) & xsin(y) - x^3cos(y) \end{bmatrix}$

Correct
Well done!

4. Calculate the Hessian for the function $f(x, y, z) = xy + sin(y)sin(z) + z^3e^x$.

1 / 1 point

- [x] $H = \begin{bmatrix} e^x z^3 & 1 & 3e^x z^2 \\ 1 & -sin(y)sin(z) & cos(y)cos(z) \\ 3e^x z^2 & cos(y)cos(z) & 6e^x z - sin(y)sin(z) \end{bmatrix}$
- [ ] $H = \begin{bmatrix} -e^x z^3 & 0 & 3e^y z^2 \\ 1 & sin(y)sin(z) & cos(y)cos(z) \\ 3e^x z & cos(y)cos(z) & 6e^{-xz} - sin(y)sin(z) \end{bmatrix}$
- [ ] $H = \begin{bmatrix} 2e^x z^3 & 1 & e^x z^2 \\ 0 & -sin(x)sin(z) & cos(y)cos(z) \\ 3e^x z^2 & cos(y)cos(z) & 6e^{2x} - sin(y)sin(x) \end{bmatrix}$
- [ ] $H = \begin{bmatrix} 3e^x z^2 & -1 & 3e^x z \\ 1 & -sin(x^2)sin(z) & cos(y)cos(z) \\ 3e^x z & cos(y)cos(z) & 6e^y z2 - sin(y)sin(z) \end{bmatrix}$

✓ **Correct**

Well done!

5. Calculate the Hessian for the function $f(x, y, z) = xycos(z) - sin(x)e^y z^3$ and evaluate at the point $(x, y, z) = (0, 0, 0)$

1 / 1 point

- [ ] $H = \begin{bmatrix} 0 & 0 & 0 \\ 1 & 0 & 1 \\ 0 & 0 & 0 \end{bmatrix}$
- [ ] $H = \begin{bmatrix} 0 & 0 & 0 \\ 1 & 0 & 0 \\ 0 & 1 & 0 \end{bmatrix}$
- [x] $H = \begin{bmatrix} 0 & 1 & 0 \\ 1 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$
- [ ] $H = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 0 \\ 0 & 1 & 0 \end{bmatrix}$