Taker Name: Key GTID: 90 Section:

Grader #1: GTID: 90

*PA#3B- §14.3: Partial derivatives*

Find the total derivative $Df$ of the function $f(r,s,t) = \begin{bmatrix} st^2 + re^{3s} \\ t\tan(rs) \end{bmatrix}$.

$x(r,s,t) = st^2 + re^{3s}$

$y(r,s,t) = t\tan(rs)$

$Df = \begin{bmatrix} x_r & x_s & x_t \\ y_r & y_s & y_t \end{bmatrix}$

$x_r = 0 + e^{3s} = e^{3s}$

$x_s = t^2 + rse^{3s}$

$x_t = 2st$

$y_r = st\sec^2(rs)$

$y_s = rt\sec^2(rs)$

$y_t = \tan(rs)$

So $Df = \begin{bmatrix} e^{3s} & t^2 + rse^{3s} & 2st \\ st\sec^2(rs) & rt\sec^2(rs) & \tan(rs) \end{bmatrix}$

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