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Math 254H **Quiz 18** **Feb 22, 2017**

Recall that $F : \mathbb{R}^n \to \mathbb{R}^m$ has Jacobian derivative matrix $[DF]$ with m rows, n columns.

1. Consider a function $\mathbf{c} : \mathbb{R} \to \mathbb{R}^2$, tracing the curve $\mathbf{c}(t) = (x(t), y(t))$. Write the derivative matrix $[D\mathbf{c}_t]$ in terms of the coordinate functions $x(t)$ and $y(t)$.

2. Consider a function $f : \mathbb{R}^2 \to \mathbb{R}$. Write the derivative matrix $[Df_{(x,y)}]$.

3. Use the Chain Rule to compute the derivative matrix of the composite function $F : \mathbb{R}^2 \to \mathbb{R}^2$ given by $F(u, v) = \mathbf{c}(f(u, v))$.