Total Differential

Learning Objectives

- Use the differential to approximate the change in a function given the change in the inputs, or to calculate maximum error

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1. A company produces two products whose joint revenue function is $R(x,y) = 1000 - 0.05x^2 + 4xy - 0.1y^2 + 2x + 4y$, where x and y are in thousands of units. Calculate the total differential at $(10,20)$. Then use the differential to estimate the value of the revenue function at (12,19).

- $dz \approx f_x(x, y)\Delta x + f_y(x, y)\Delta y$

ANSWER KEY

1. $dz \approx (-0.1x + 4y + 2)\Delta x + (4x - 0.2y + 4)\Delta y; dz \approx 122, f(12,19) \approx 1482$