

Bad Box

SAM

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For example

$$\Delta f = \frac{\partial^2 f}{\partial x^2} + \frac{\partial^2 f}{\partial y^2} \approx \frac{f(x+h, y) + f(x-h, y) + f(x, y+h) + f(x, y-h) - 4f(x, y)}{h^2} \quad (1)$$

It is not necessary to approximate Δf by approximating the second partials separately in this way. Another second order accurate approximation is

$$\Delta f(x, y) \approx \frac{f(x+h, y+h) + f(x+h, y-h) + f(x-h, y+h) + f(x-h, y-h) - 4f(x, y)}{2h^2}.$$