

## SCHOOL OF MATHEMATICS AND PHYSICS

### Taylor series approximation

Determine the first and second order Taylor formula for the given function about the given point  $(x_0, y_0)$ .

1.  $f(x, y) = (x + y)^2$ , where  $x_0 = 0, y_0 = 0$ .
2.  $f(x, y) = \frac{1}{x^2+y^2+1}$ , where  $x_0 = 0, y_0 = 0$ .
3.  $f(x, y) = e^{x+y}$ , where  $x_0 = 0, y_0 = 0$ .
4.  $f(x, y) = \frac{(x-1)^2}{(y-3)^2}$ , where  $x_0 = 4, y_0 = 6$ .
5.  $f(x, y) = e^{(x-1)^2}$ , where  $x_0 = 1, y_0 = 0$ .

Use the simulation from the SciMS website to visualise the first and second order Taylor series approximations and to check your results. Click on the link below or type the URL into your browser's address bar.

[https://teaching.smp.uq.edu.au/scims/Num\\_analysis/Taylor.html](https://teaching.smp.uq.edu.au/scims/Num_analysis/Taylor.html)

