> **First a 1 variable exmaple**

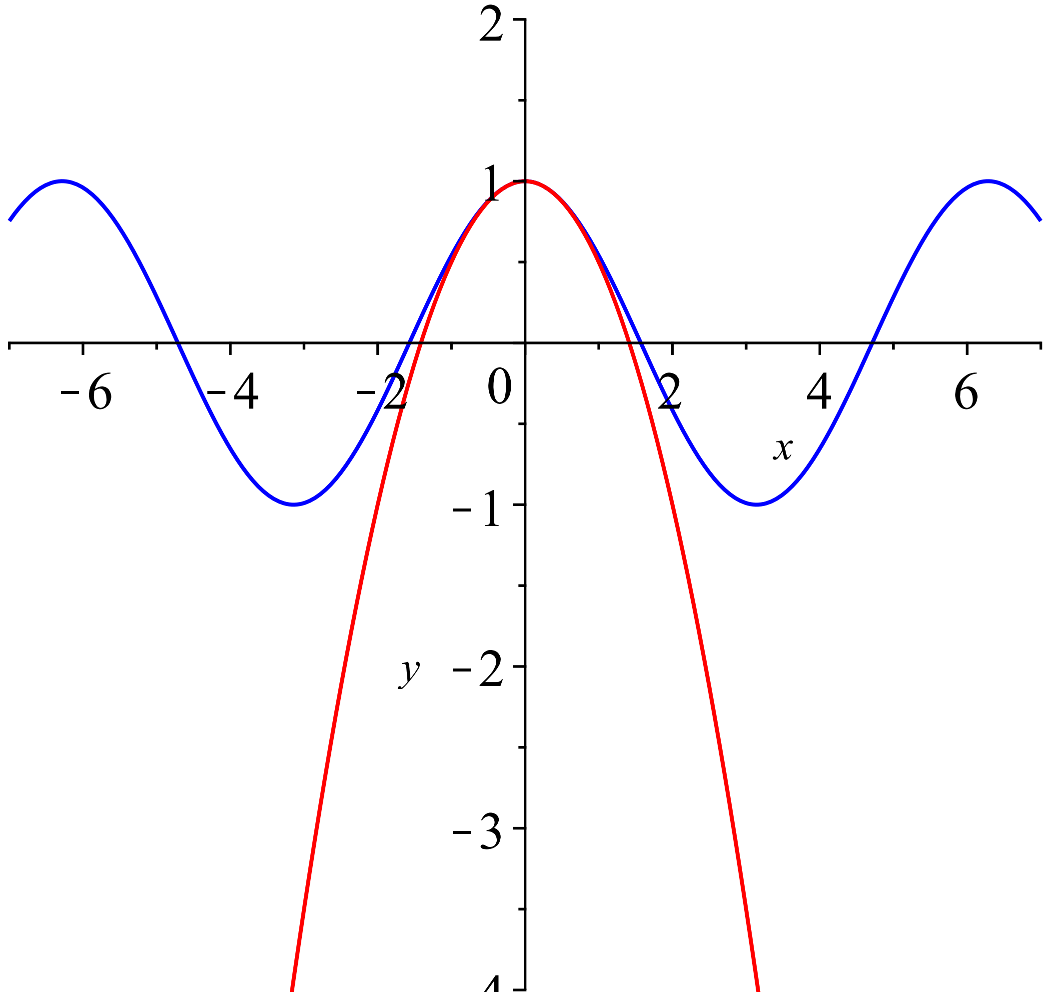
> *restart*;

> $g := \cos(x);\ Tg := 1 - \frac{x^2}{2};$

$$g := \cos(x)$$

$$Tg := 1 - \frac{x^2}{2} \tag{1}$$

> $plot([g, Tg], x=-7..7, y=-4..2, color=[blue, red]);$



> *Now a* $2-$*variable example* : *Example* 2, *Adams* **and** *Essex Section* 12.9

> $f := \mathrm{sqrt}(x^2 + y^3);$

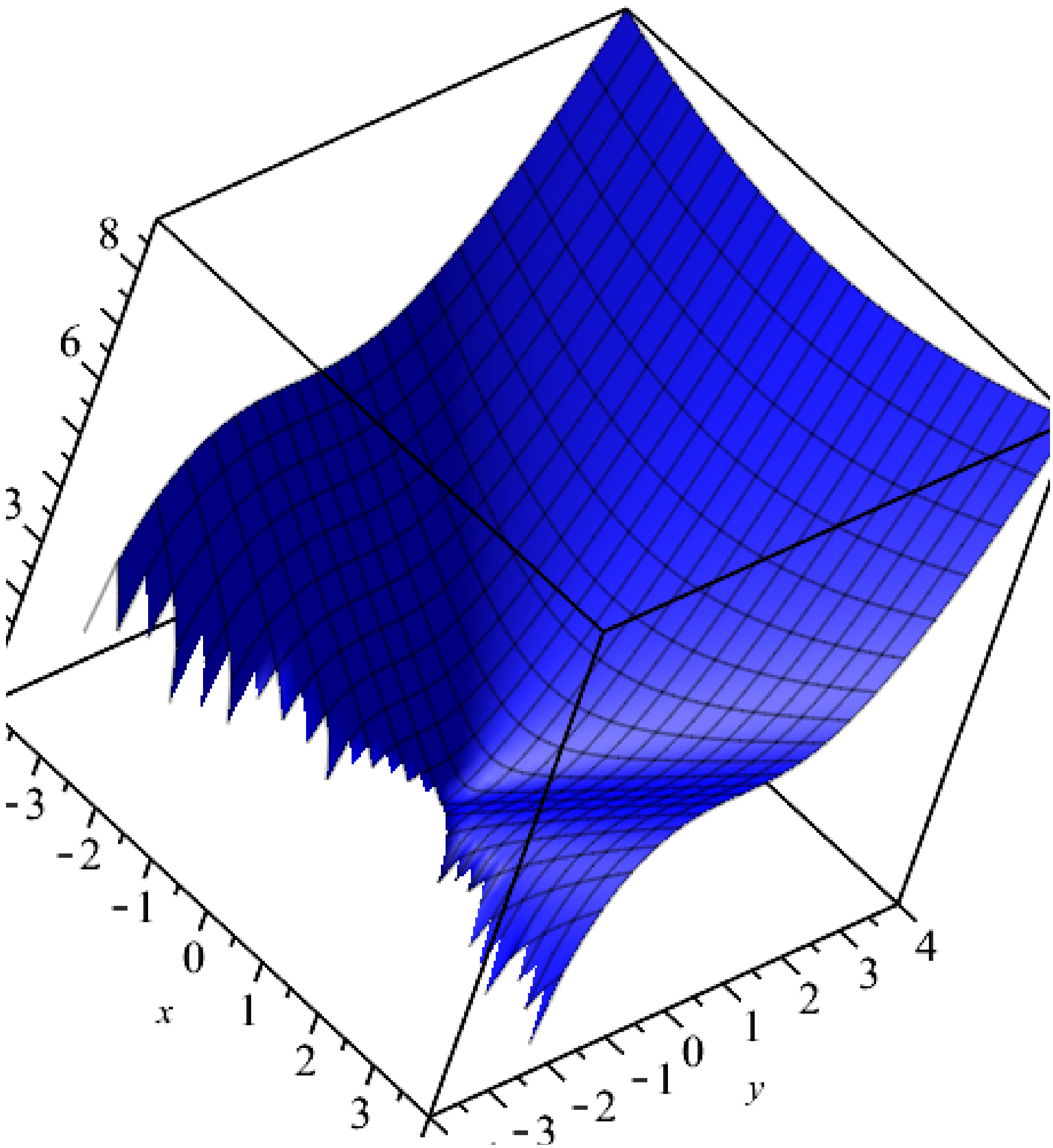
$$f := \sqrt{y^3 + x^2} \tag{2}$$

> **Here is the Taylor polynomial centered at (x,y) = (1,2). Computed by hand or with the maple command**

> $Tf := mtaylor(f, [x=1, y=2], 3);$

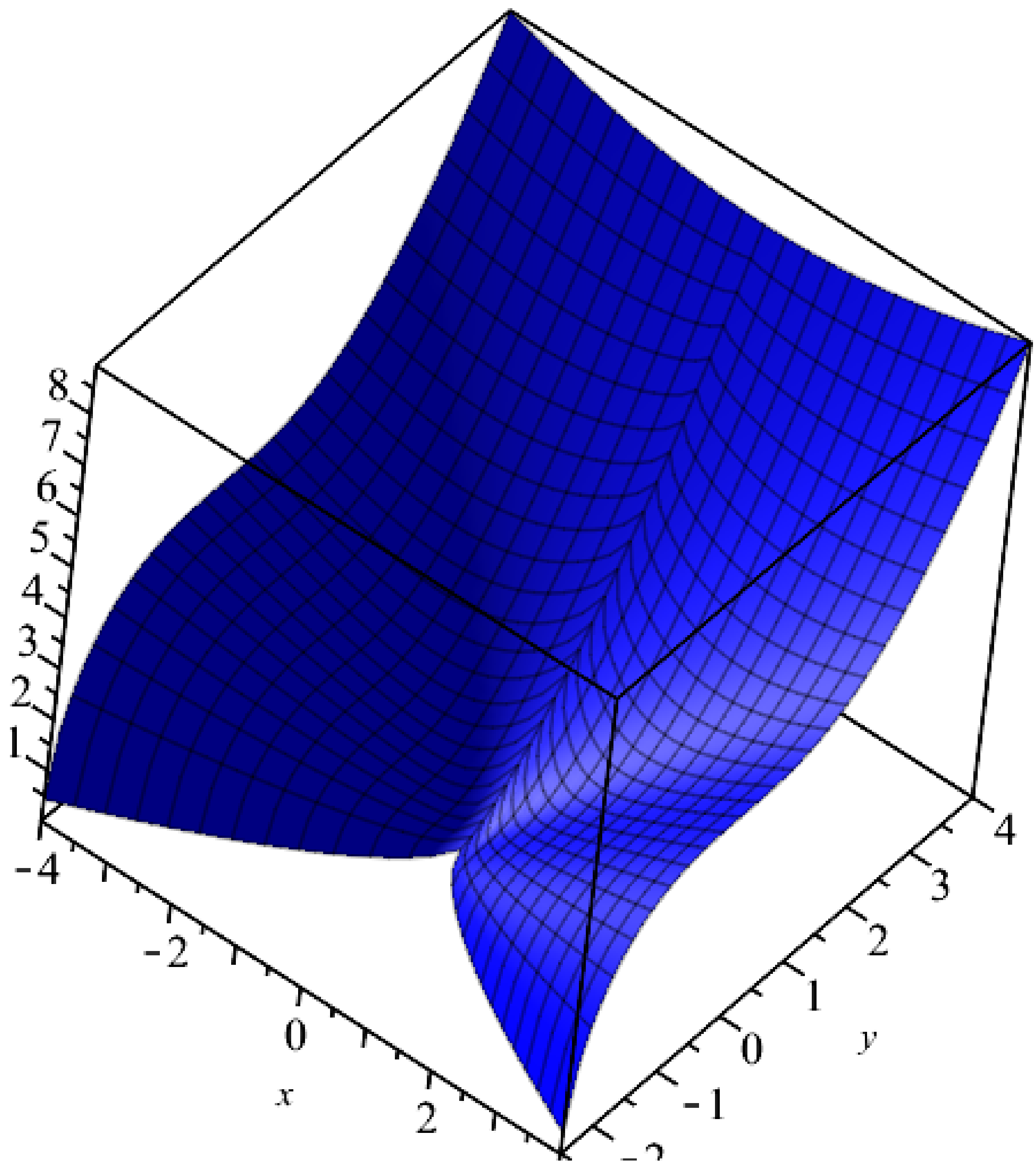
$$Tf := -\frac{4}{3} + 2y + \frac{x}{3} + \frac{4(x-1)^2}{27} - \frac{2(y-2)(x-1)}{9} + \frac{(y-2)^2}{3} \tag{3}$$

> $plot3d(f, x = -4..4, y = -4..4, color = blue);$

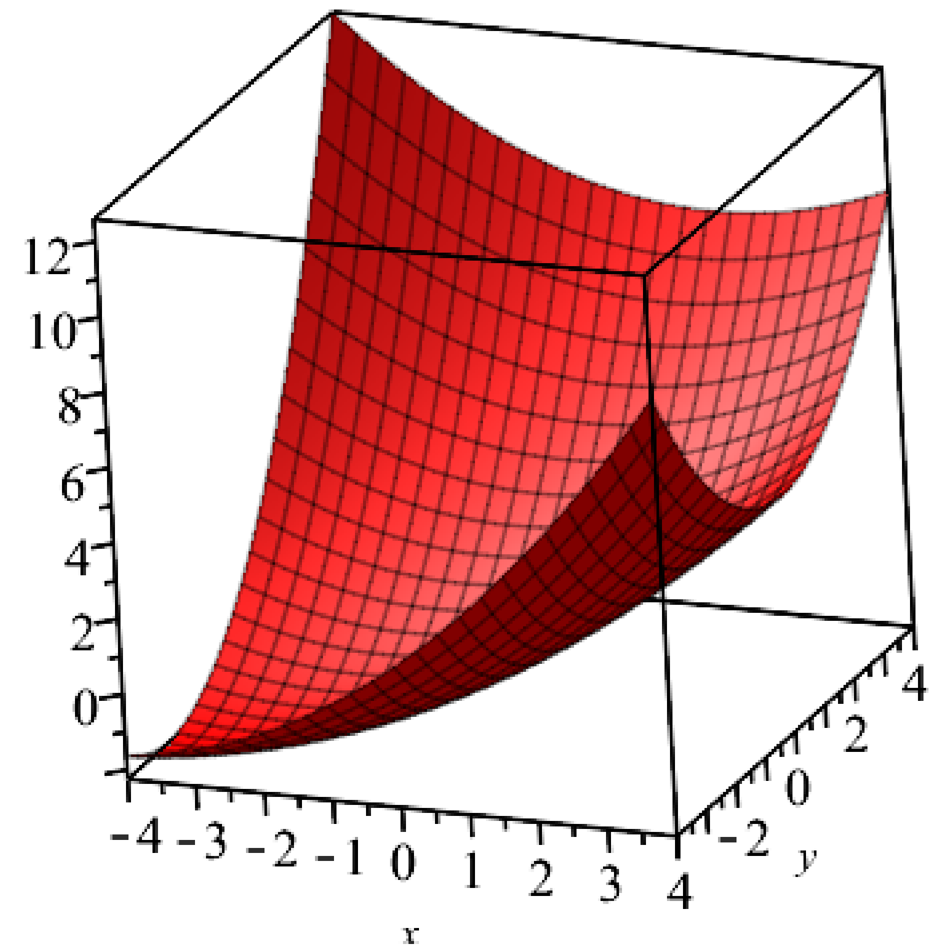


> **Looks better if plotted over its domain with a 0.01 fudge facter to stop the jagged edges.**

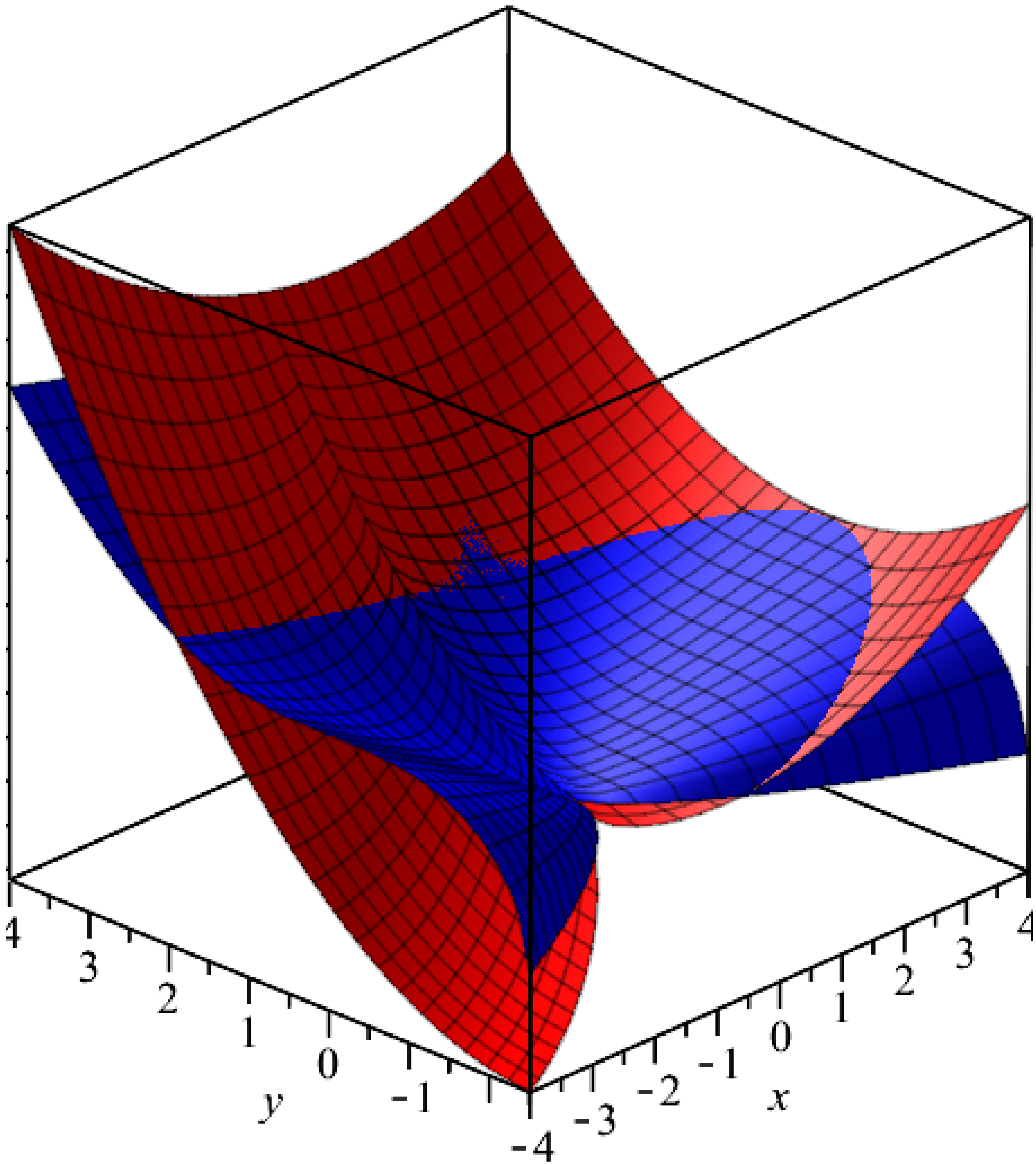
> $plot3d\left(f, x = -4..4, y = -\left(\left(x^2\right)^{\frac{1}{3}}\right) + 0.01..4, color = blue\right);$



> $plot3d(Tf, x = -4 .. 4, y = -4 .. 4, color = red);$

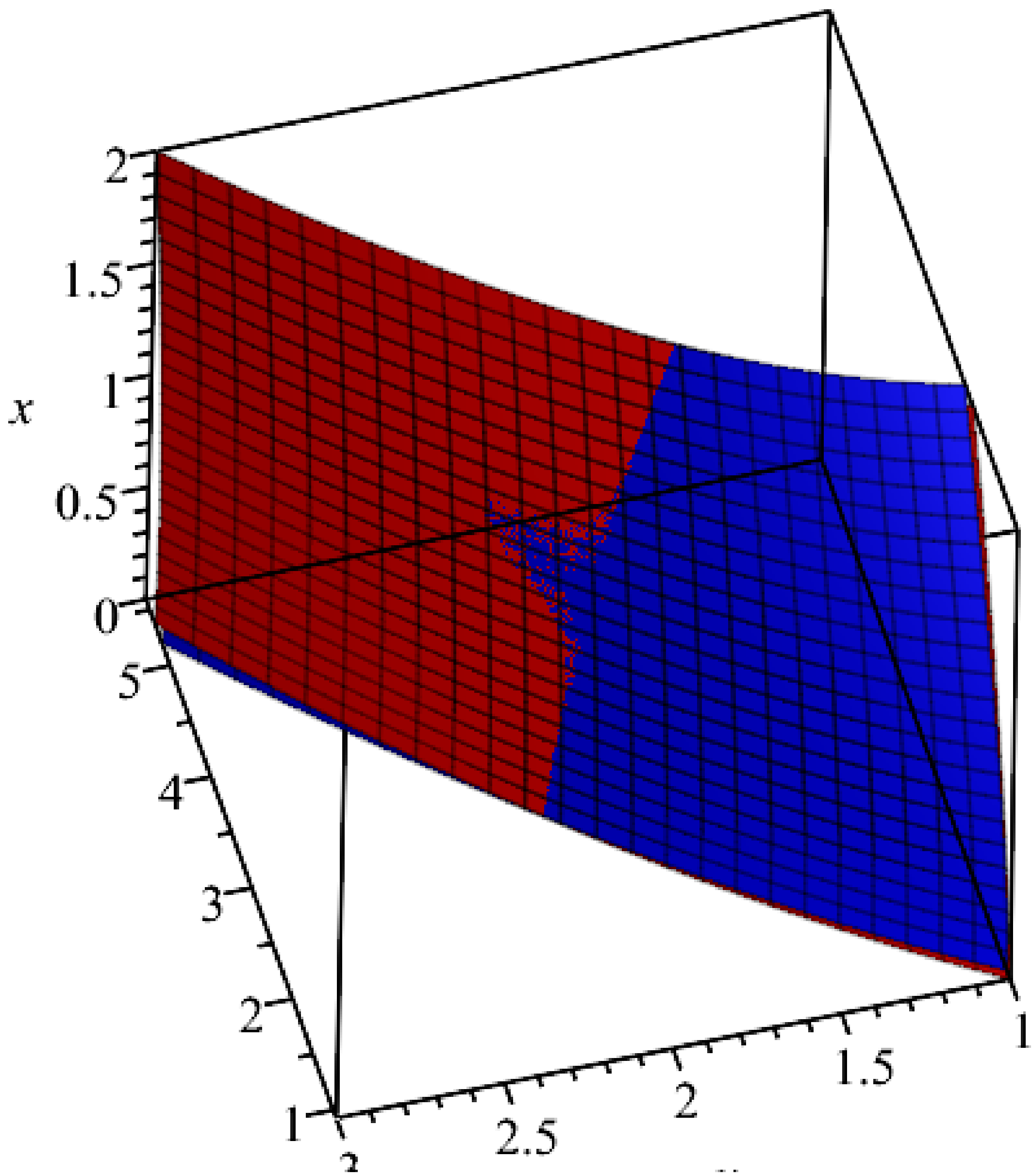


> $plot3d\left([f, Tf], x = -4..4, y = -\left((x^2)^{\frac{1}{3}}\right) + 0.01..4, color = [blue, red]\right);$



> **Zooming in at point of approximation.**

> $plot3d([f, Tf], x = 0..2, y = 1..3, color = [blue, red]);$



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(4)