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P1: $2^3 + 3(2)^2 - 11(2) + 2 = 0$

$8 + 12 - 22 + 2 = 0$

Thus $z = 2$ is a solution

$3^3 + 3(3)^2 - 11(3) + 2 = 0$

$23 \neq 0$

Thus $z = 3$ is not a solution

P2: $\sin(\pi) = 0$

thus $z = \pi$ is a solution

$\sin(\pi/2) = 1$

thus $z = \pi/2$ is not a sol

P3: $\sin^2 z + \cos^2 z = 1$, $z = \pi/5$

$\sin^2(\pi/5) + \cos^2(\pi/5) = 1$

Thus $z = \pi/5$ is a sol

$\sin^2(\pi/3) + \cos^2(\pi/3) = 1$

Thus $z = \pi/3$ is a sol

P4: $\sin^2 z + \cos^2 z = 1$

Since this is a trig identity, any z will make this equation true.

P5: $x(t) = t^4$

$x'(t) = 4t^3$

$x''(t) = 12t^2$

$x''(2) = 12(2)^2 = 48$

P6: $x = 1$

$f(1) = 0 + 1$

So $f(1) = 1$ so $x=1$ is a fixed point

$x = 2$

$f(2) = 0 + 2$

$f(2) = 2$ so $x=2$ is a fixed point

$x = 3$

$f(3) = 0 + 3$

$f(3) = 3$ so $x=3$ is a fixed point

$x = -1$

$f(-1) = (-2)(-3)(-4) + (-1)$

$= -25$

So $x=-1$ is not a fixed point

P7: $(x,y) = (0,-1)$

$f(x,y) = (x+y+1,\ x-y-2)$

$f(0,-1) = (0-1+1,\ 0+1-2)$

$f(0,-1) = (0,\ -1)$

So $(0,-1)$ is a fixed point in R^2

$f(1,1) = (1+1+1,\ 1-1-2)$

$f(1,1) = (3,\ -2)$

So, $(1,1)$ is not a fixed point.

P8: $f(x) = 1 / (x+1)$

a) $f(0.5) = \dfrac{1}{(1/2+1)} = 2/3$

$f(2/3) = \dfrac{1}{2/3+1} = 3/5$

$f(3/5) = \dfrac{1}{3/5+1} = 5/8$

Thus the first 3 term are, ~~[2/3], [3/5], [5/8]~~

(0.5), (2/3), (3/5)

b) Using Orb

Orb([1/(x+1)], [x], [0.5], 0, 2);

c) Orb([1/(x+1)], [x], [0.5], 1000, 1000)[1]

$\boxed{0.6180339887}$

p9: $f(x,y,z) = (x/(1+y+z),\ y/(1+x+z),\ z/(1+x+y))$

a) $f(1,1,1) = [1/3, 1/3, 1/3]$

$f(1/3, 1/3, 1/3) = [1/3 / (1 + 1/3 + 1/3)] = \boxed{1/5}$

So, $f(1/3, 1/3, 1/3) = [1/5, 1/5, 1/5]$

Thus the first 3 terms are

$[1.0, 1.0, 1.0], [1/3, 1/3, 1/3], [1/5, 1/5, 1/5]$

b) $\mathrm{Orb}\left(\left[\frac{x}{(1+y+z)}, \frac{y}{(1+x+z)}, \frac{z}{(1+x+y)}\right], [x,y,z], [1.0, 1.0, 1.0], 0, 2\right);$

c) $\mathrm{Orb}\left(\left[\frac{x}{(1+y+z)}, \frac{y}{(1+x+z)}, \frac{z}{(1+y+z)}\right], [x,y,z], [1.0, 1.0, 1.0], 1000, 1000\right)[1]$

$= \boxed{[0.0004997501157, 0.0004997501157, 0.0004997501157]}$.

P11: $x(n) = x(n-1)^2 - 2x(n-1) + 2$

$f(x) = x^2 - 2x + 2$

$x = x^2 - 2x + 2$

$3x = x^2 + 2$

$x^2 - 3x + 2 = 0$

$\boxed{x = 2 \quad , x = 1}$ $\rightarrow$ eq sol

P12: $x(n) = 5/2\, x(n-1)(1 - x(n-1))$

$f(x) = 5/2\, x(1-x)$

$x = 5/2\, x(1-x)$

$2x = 5x(1-x)$

$2x = 5x - 5x^2$

$-5x^2 + 3x = 0$

$\boxed{x = 0 \quad x = 3/5}$ $\rightarrow$ eq sol

P13: $x(n) = K\, x(n-1)(1 - x(n-1))$

$f(x) = Kx(1-x)$

$x = Kx(1-x)$

$x = Kx - Kx^2$

$-Kx^2 + (Kx - x) = 0$

$\boxed{x = 0, \quad x = \frac{K-1}{K}}$

P11: Using calculus:

$x = 2$, $x = 1$

$f(x) = x^2 - 2x + 2$

$f'(x) = 2x - 2$

$f'(2) = 2(2) - 2$

$= 4 - 2 = 2$ Thus unstable

$f'(1) = 2(1) - 2$

$= 0$ so stable

Thus $x = 2$ is unstable and $x = 1$ is stable

P12: Using calculus:

$x = 0$, $x = 0.6$ or $3/5$

$f(x) = 5/2\,x - 5/2\,x^2$

$f'(x) = 5/2 - 5x$

$f'(0) = 5/2 - 0$ so unstable

$f'(0.6) = 5/2 - 5(0.6)$

$= -0.5$

$|-0.5| < 1$ so stable

Thus $x = 0$ is unstable and $x = 0.6$ is stable