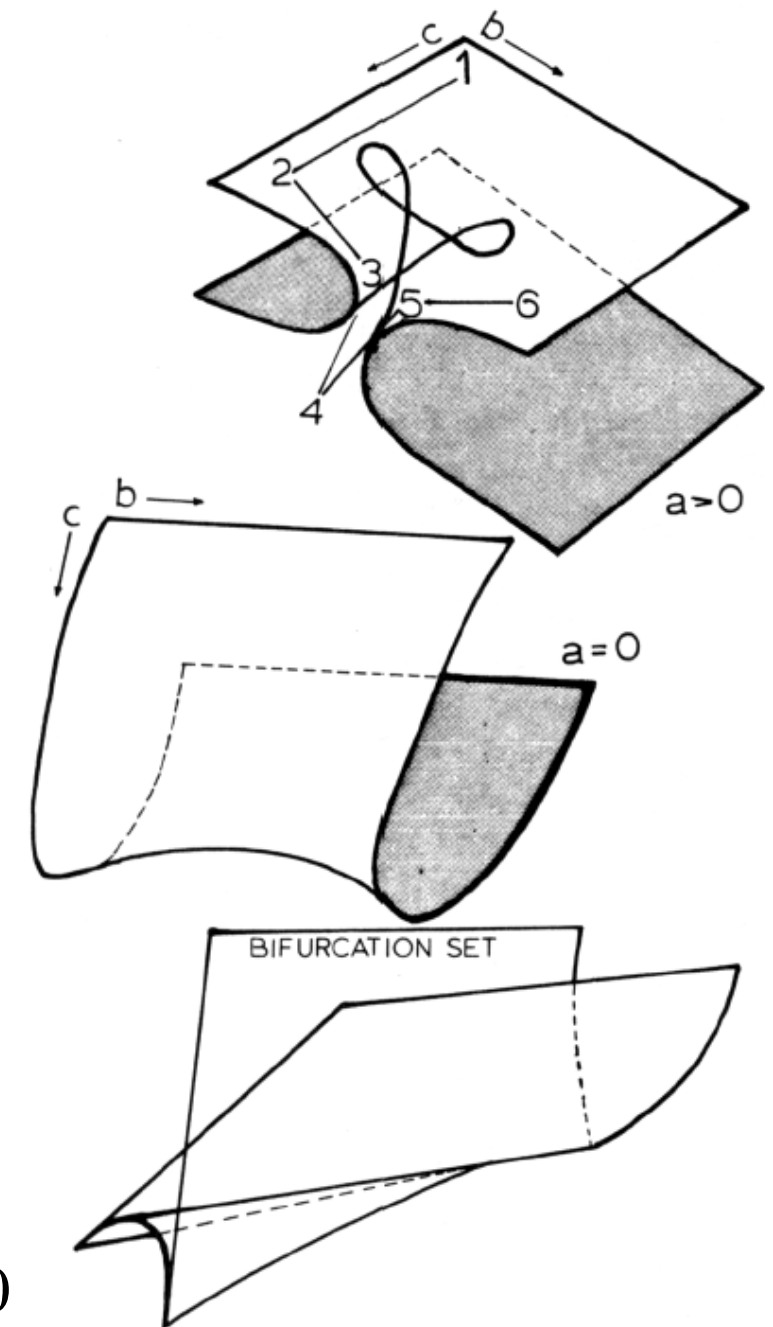
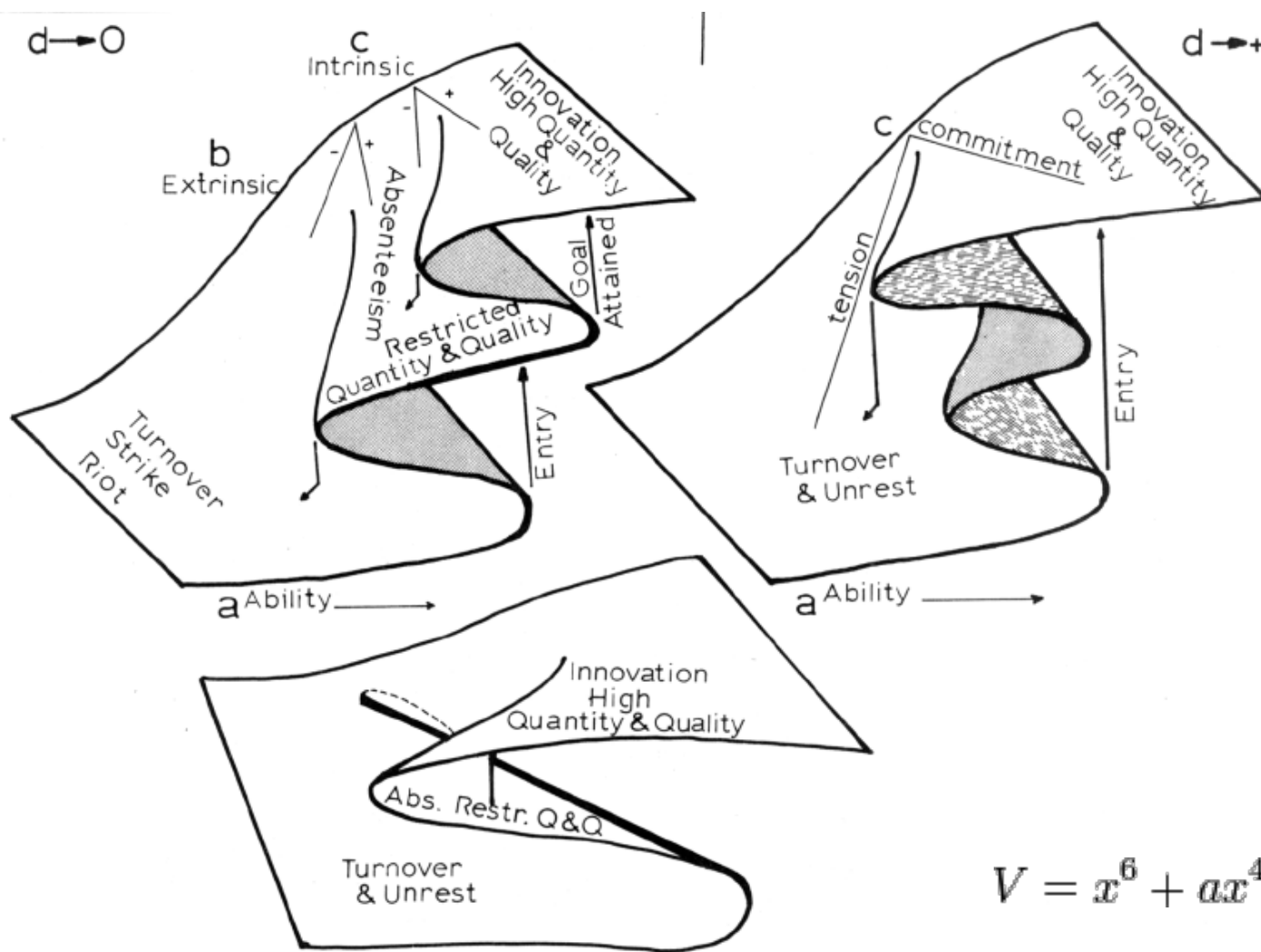


These Catastrophe Models Are/Have Been Used by Scientists (More are Theoretically Possible)

# Control variables	1 dependent variable	2 dependent variables	Equilibrium equation contains
1	Fold		x^2
2	Cusp		x^3
3	Swallowtail	Hyperbolic and Elliptic umbilic	x^4 / y^4
4	Butterfly	Parabolic umbilic	x^5 / y^5

Butterfly Catastrophe: Application in Organisational Psychology - Leadership

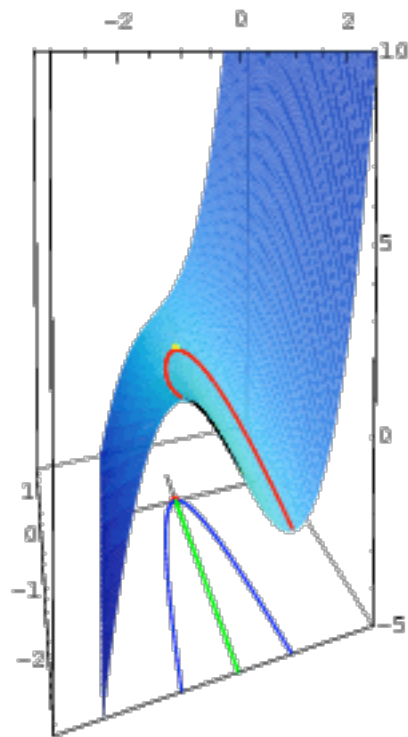


$$V = x^6 + ax^4 + bx^3 + cx^2 + dx$$

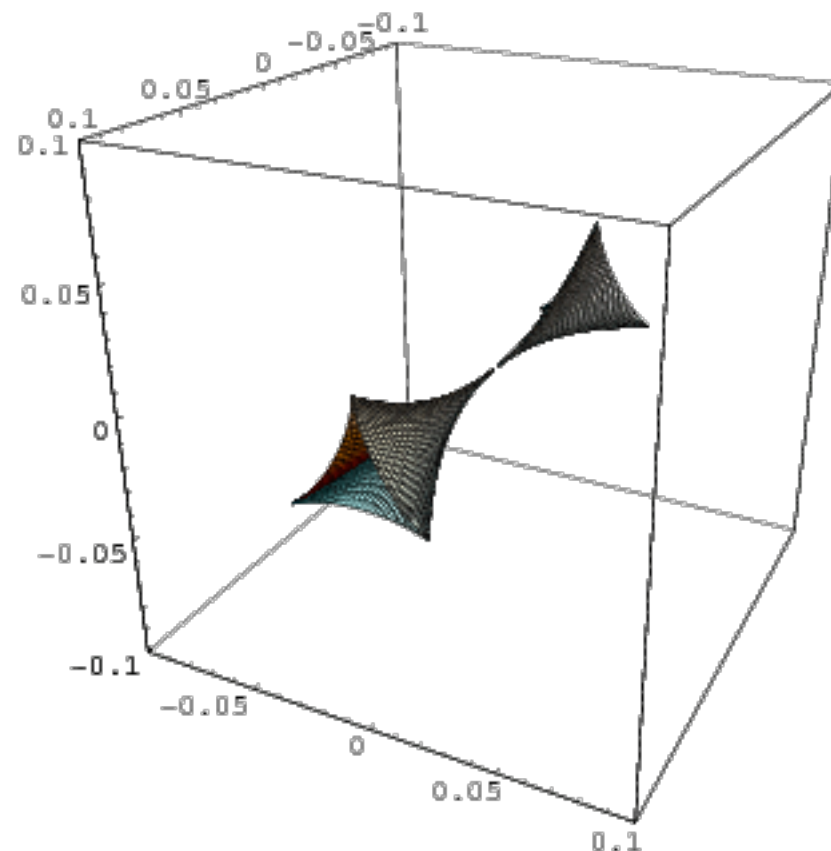
$$6x^5 + 4ax^3 + 3bx^2 + 2cx + d = 0$$

$$x^5 + \frac{2}{3}ax^3 + \frac{1}{2}bx^2 + \frac{1}{3}cx + \frac{1}{6}d = 0$$

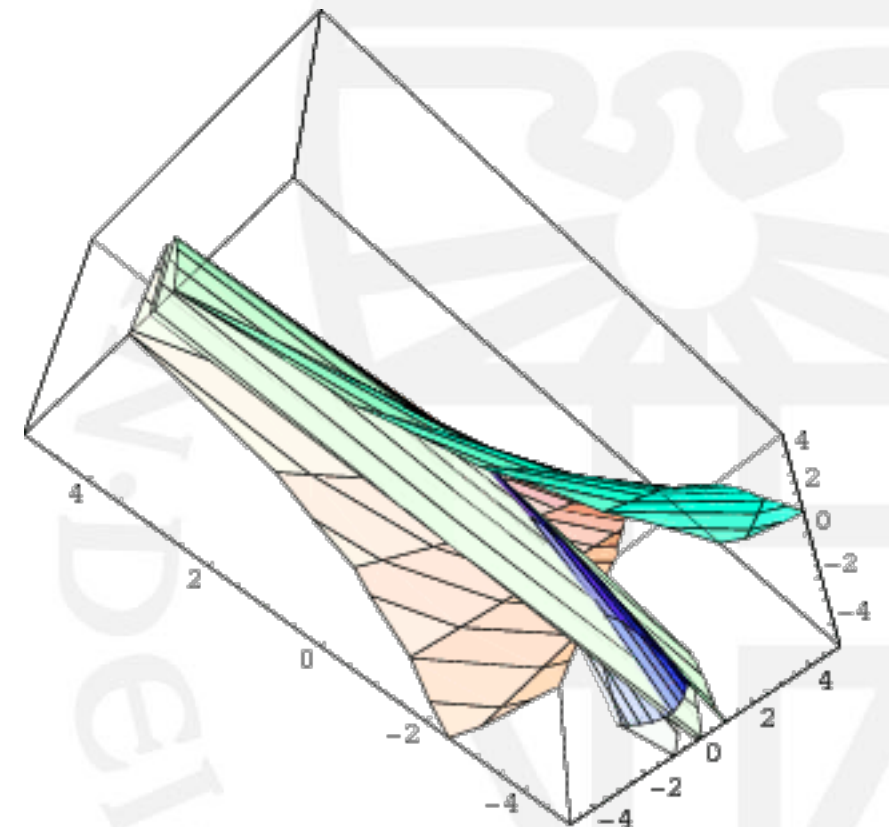
These Catastrophe Models Are/Have Been Used by Empirical Scientists (More Models are Theoretically Possible)



Fold



Elliptic umbilic



Parabolic umbilic

