Introduction

Symbol	Parameter	Baseline	Minimum	Maximum
	Wing area (ft)	174	150	200
	Weight of fuel in wing (lb)	252	220	300
	Aspect ratios	7.52	6	10
	Quarter-chord sweep (deg)	0	-10	10
	Dynamic pressure at cruise (lb/ft)	34	16	45
	Taper ratio	0.672	0.5	1
	Aerofoil thickness to chord ratio	0.12	0.08	0.18
	Ultimate load factor	3.8	2.5	6
	Flight design gross weight (lb)	2000	1700	2500

Computer code

In **coded variables** (   ), with baseline as the default.

```
k]b[kh O! Zi bchi cbflGk1$"(, ž KZk1$"&, ž 51$"', ž @1$")ž e1$"*&ž `1$"'((ž FhWl$"(ž
       Bn1$"'+ž KX[1$"', Ł
  o
       ## put coded inputs back on natural scale
       Gk   Gkl fl&$$ ! %) $ Ž %) $
       KZk  O! KZkl fl$$ ! &&$Ł Ž &&$
       5 O! 5l fl%$ ! *Ł Ž *
       @ O! Ō
```

Sensible but expensive

Well that's all fine and good. We've learned about two pairs of inputs (out of 36 pairs)

Slices have lower resolution, …

U&ˈO! ˈk\]W\fl`[VV&˘U`d\Uˈ11ˈ%Ł/ˈU&ˈO!ˈU&OcfXYffl`[VV&˘aUW\OU&QŁQ /˚//₡₮²ˈdUghYfl²`Yb[h\flU&Łˈ1˝₮²``Yb[h\flU&Ł

%ž˙Q²⁻⁻

%&,

- These are shocks where radiation from the shocked matter dominates the energy transport, and results in a complex evolutionary structure.

The University of Michigan's **C**enter for **Ra**diative **S**hock **H**ydrodynamics (**CRASH**) is tasked with modeling a particular high-energy laser radiative shock system.

They have

- collected a small amount data from a limited field experiment
- and itSPMMM

Computer model calibration

However, there is likely predictability left on the table.

- Physical phenomena rarely covary linearly.

We will see how to combine computer model and field data of this sort

- via **computer model calibration**:
    - (non-linearly) emulating the computer model with GPs;

A case study

Consider the 580-acre Lockwood Solvent Groundwater Plume Site, an EPA Superfund site located near Billings Montana.