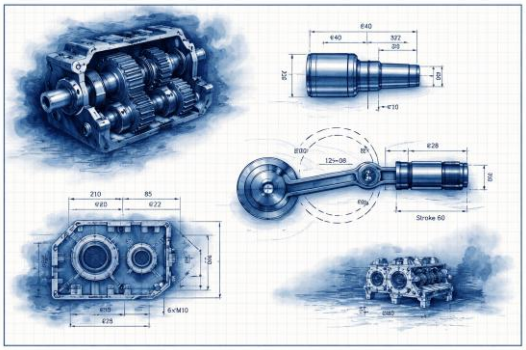
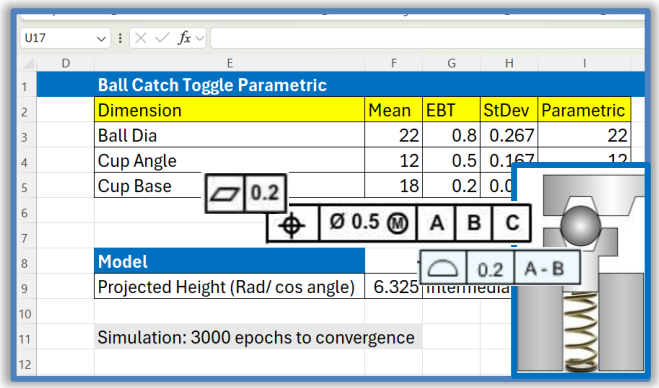
Tolerance Stack-up Analysis
Engineering Support



Every tolerance causes variation. We show you how. And help you control it.

Make Your Designs Work First Time. Not After Trials.
We help engineering teams **predict, understand, and control dimensional variation** — before you cut metal, or mold plastic
Not by black-box software... But by **engineering models you can trust.**



	Ball Catch Toggle Parametric				
	Dimension	Mean	EBT	StDev	Parametric
	Ball Dia	22	0.8	0.267	22
	Cup Angle	12	0.5	0.167	12
	Cup Base	18	0.2	0.0	
	Model				
	Projected Height (Rad/ cos angle)	6.325			
	Simulation: 3000 epochs to convergence				

Our Approach

First-Principles Variation Engineering.
We build tolerance models from fundamental geometry, physics, and kinematics.

- No hidden assumptions
- No opaque solvers
- Every variation source is visible and traceable

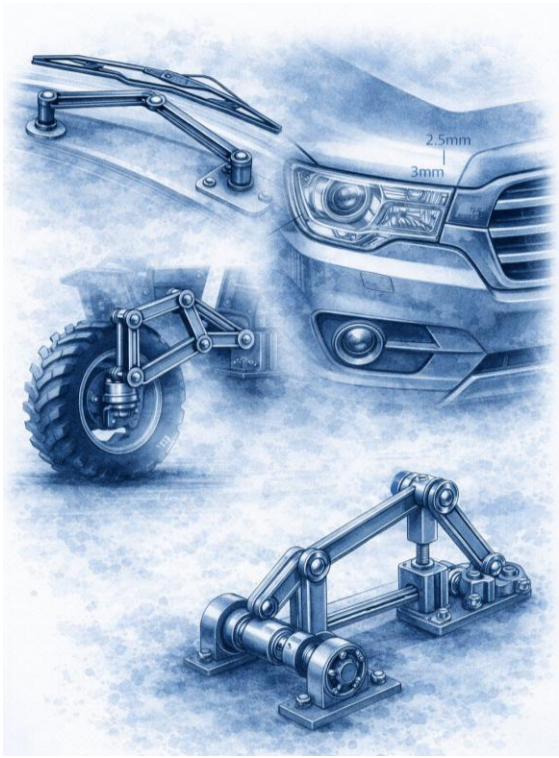
You see exactly how each tolerance contributes to the final variation

What We Handle

1. Multidimensional Stack-ups
1D, 2D, and full 3D tolerance chains.
Complex geometric relationships.
Datum-driven assemblies.

2. Tough Non-Linear Problems
Trigonometric and geometric non-linearities Contact conditions and constraints.
Real-world assembly behavior.

3. Kinematic Systems
Moving mechanisms.
Variation across motion range
Linkages, joints, and dynamic relationships.



How We Model Your System

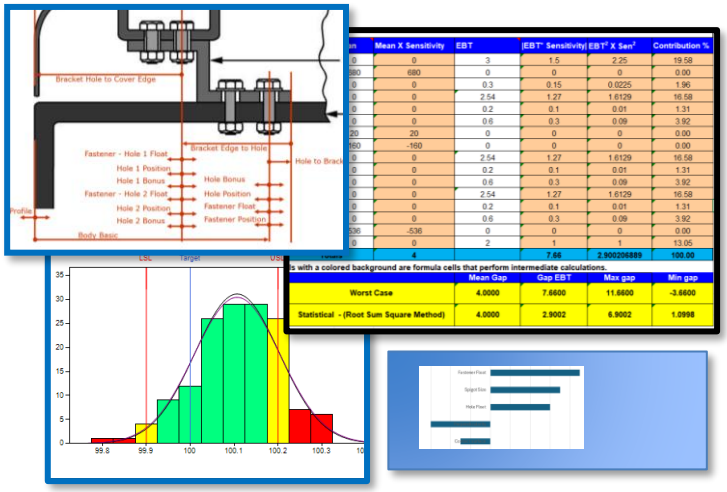
We combine:

Vector Loop Modelling

- Clear geometric representation
- Directional variation tracking
- Ideal for assemblies and mechanisms

Monte Carlo Simulation

- Realistic variation prediction
- Distribution-based outcomes
- Sensitivity insights



What You Get

1. Full Variation Visibility - No guesswork.

We show you the contribution of each tolerance identified. Highlight critical Size & GD&T contributors that you should act upon.

2. Optimized Tolerancing Scheme - We don't just analyze - we improve.

We give GD&T recommendations (Position, Profile, Datums….). We help in Linear and size tolerance allocation. We help you achieve a balance between performance and cost.

3. Design for Manufacturability –

Practical tolerances aligned with manufacturing capability. We help you avoid over-tolerancing and under-tolerancing.

4. Clear Engineering Outputs

Vector loop diagrams, Sensitivity tables, Statistical plots.

Why Work With Us?

- We think like **designers**, not just analysts.
- We **explain** - not just simulate.
- We focus on **decisions,** not just numbers

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