

Isotropic safety and its use(s)

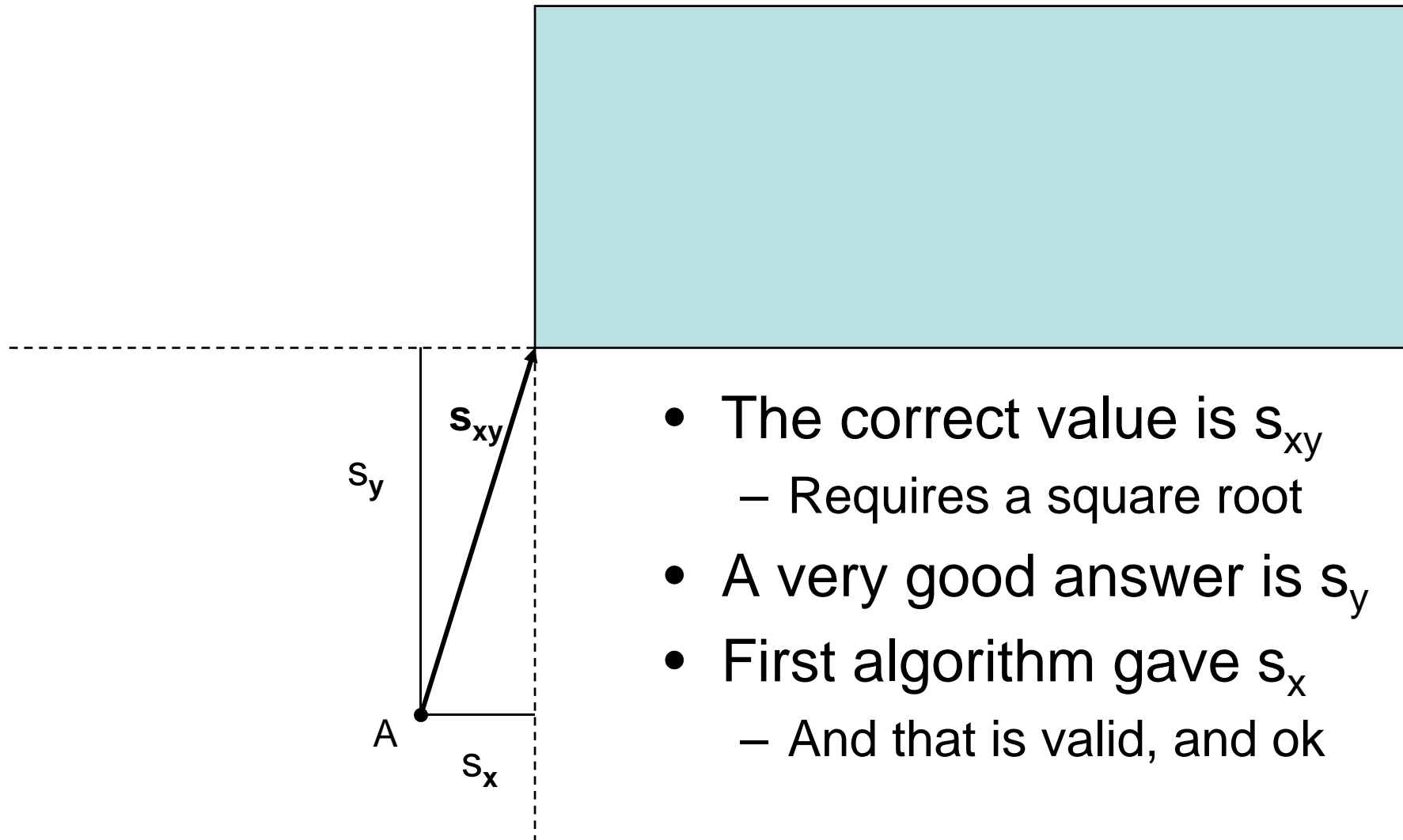
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Working/issue parallel session
of 19 Sept 2007

Overview

- What the Geometry provide
 - How the EM processes use it
 - Difficulties with precision
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- Presentations
 - Vladimir Ivantchenko
 - Alex Howard

Speed, over 'optimal' value



- The correct value is s_{xy}
 - Requires a square root
- A very good answer is s_y
- First algorithm gave s_x
 - And that is valid, and ok

Sources of isotropic safety

- Values in Pre/Post Step Point
 - Are these as good as possible?
- Safety Helper (cache for Navigator)
 - Is this better values
- G4PathFinder parallel
 - Caches values from Navigator(s)
 - For Stepping, ComputeSafety
- Navigator directly
 - ComputeStep also gives (start point) safety
 - ComputeSafety (at 1st for step endpoint, now any)
 - Always recomputes value
 - Extra work to cope with ‘any’ point – new method for endpoint?

EM processes and safety

- Many EM uses for isotropic safety
 - In Multiple Scattering
 - Limits lateral displacement

Challenges

- Alex H. investigated problems in 'reproducing' results with parallel navigation
- Since calculation of endpoint safety uses
 - $\text{Max}(\text{double-double}, 0.)$
 - the imprecision of this is leading cause of differences (between parallel and old transport)
- Several other risky comparisons

Preliminary conclusions

- Agreed to enforce (better) rounding
 - Round very-small safety to zero
 - $\text{Safety} < \text{kCarTolerance}$ should become 0 (zero)
 - Which classes to change? (First list)
 - SafetyHelper ComputeSafety
 - Navigator
 - SteppingManager
 - Solids (expected, JA)
- Continue investigation (and session?)
 - Potentially inspect/review relevant classes