

# Full kernel Space Analysis for TEST

Model iAB\_RBC\_283 with uncapped kernel space of type Compact  
calculated on Tue 16 Mar 2021 in 2.16 seconds.

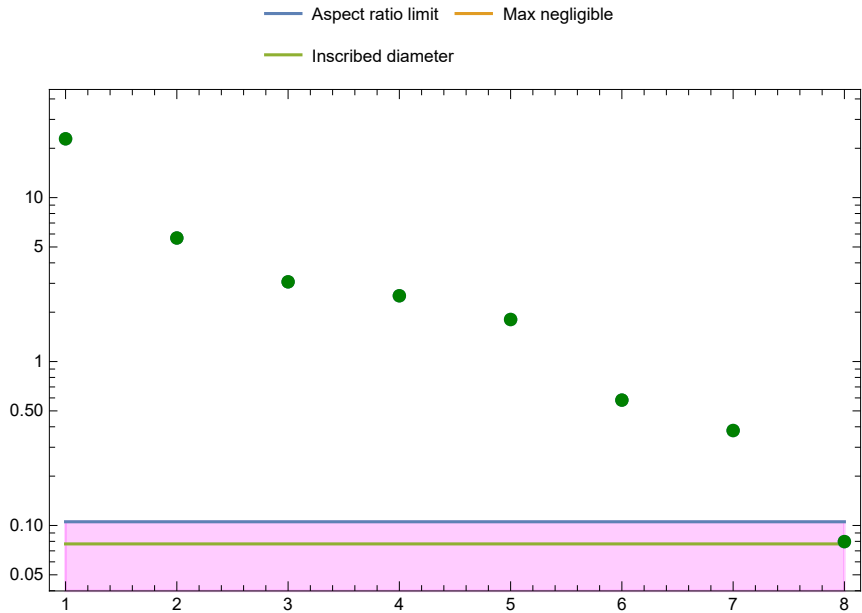
Step time limit	60.	Stop sampling when failure rate >	20
LP tolerance	0.0001	Minimal, Maximal LP chord counts	{10, 50}
Fixed value tolerance	0.002	Maximal flips to find LP chords	25
Progenitor sample size	20	Aspect ratios $\geq$ this are flattened	50.
Max BFBF tree nodes	200000	Diameters > this not flattened	0.002
BFBF random greedy sample size	500	Default capping radius	1.
Greedy search mixing fraction	0.8	Flux bounds $\geq$ this are taken as artificial	1000.

	Constraints	Variables	Ray Yield
Stoichio, objective and range constraints	1281	469	0
Remove artificial bounds, split reversibles	1127	645	0
Fix 271 fluxes, revert reversibles	368	198	0
Apply mass balance and fixed objective value	0	12	0
Apply nontrivial range constraints	33	12	0
Remove prismatic rays	30	9	3
Linealities yielding ray pairs	30	8	2
Remove redundant constraints	14	8	0
RSS is closed, no capping done	14	8	0

All points in the solution space share the objective value 2.93556  
All 8 chords were calculated by LP for the CSS.  
The maximal inscribed hypersphere diameter is 0.0771845  
The mean inscribed radii of mutually similar simplices that enclose the  
periphery points and the complete CSS respectively, are {3.21143, 4.1155}  
with radius and volume ratios {78.0, 13.7}% respectively.  
The sampled fraction of the CSS spanned by the  
peripheral point polytope, is in the 95% confidence interval {26, 31}%  
The following reactions acquired fixed directions:  
{38, backwards} {57, forwards}  
60 peripheral points were found.  
Assuming these to be representative, and combining with rays, extends  
the fixed value list to 408 items  
The combined set of 4 rays span 4 of the total 4 ray dimensions.

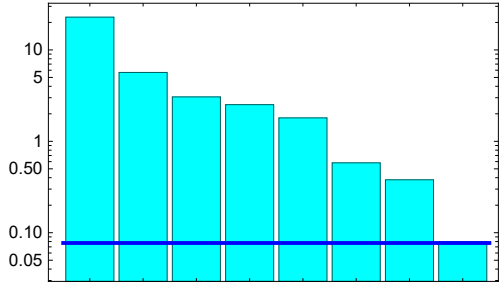
VALIDATION TEST: Deconstruct FBA solutions (with/without artificial bounds)  
into the sum of a Kernel space flux, and a flux along a ray direction.  
Agreement between actual and reconstituted solutions are indicated by % discrepancy  
of total flux, and angle in degrees between their directions in flux space.

FULL SS KERNEL		Mean flux per reaction	% Flux mismatch	Misalignment angle deg
	Not bounded	1.7	0.	0.
	Art. bounded	52.1	0.	0.



## MAIN ORTHOGONAL CHORD LENGTHS

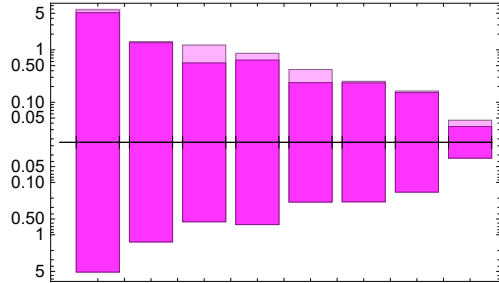
Cyan chords, magenta diameters  
Blue line is max inscribed sphere diameter



The mean and maximal aspect ratio's are 8.1 and 286.6

## SPLIT DIAMETERS ALONG MAIN CHORD DIRECTIC

Asymmetric overhang shown in light shading.



Average periphery point non-centrality 13.4%