

# Notes on "The Calabi-Yau Landscape"

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## 1 Prologue

- $\Sigma$  - Surface
- $g(\Sigma)$  - Genus of the surface, i.e. the number of holes.
- $\chi(\Sigma) = 2 - 2g(\Sigma)$  - Euler characteristic
  - Signed alternating sum of the number of independent objects in each dimension. For example, a cube drawn on  $S^2$  has 8 vertices, 12 edges and 6 faces, thus  $\chi(\Sigma) = 8 - 12 + 6 = 2$
  - Betti number,  $b_i$ , counts the number of independent algebraic cycles in dimension  $i$ .
  - $\chi(\Sigma) = \sum_{i=0}^2 b_i$  ,  $b_i = \text{rk}(H_i(\Sigma))$
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