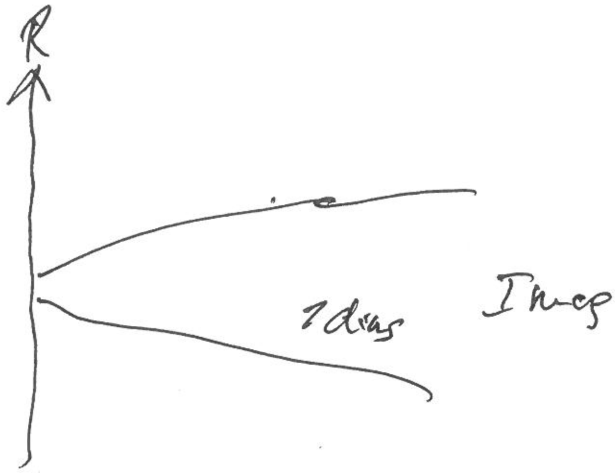

$$\sum_{i=1}^{7} x_i^2 = 1 \qquad \underline{\underline{S^6}}$$

$\Rightarrow$ Almost complex structure J on S^6

Non-integrable.

1954 Hirzebruch,

Sheaf Cohomology

X complex manifold $\dim_{\mathbb{C}} = n$

$\to H^q(X, \Omega^p)$ $\quad p, q = 0 \dots n$

X algebraic Hodge Theory $H^{p,q}$ $\underline{h^{p,q}}$

$$\sum_{p,q} (-1)^{p+q} h^{p,q} = \text{Euler Number}$$

Hodge

$$\sum_{p,q} (-1)^p \cdot h^{p,q} = \underline{\text{Signature}}\,(X)$$

<u>Kähler metrics</u> Mannoury.

X <u>Atiyah-Singer Index Theorem</u> ~ $\underline{\underline{1960}}$

Hirzebruch-Riemann-Roch HRR.

$S^1 \times S^3$ $\qquad S^3$

$\qquad\qquad\quad\ \downarrow$

$S^1 \times S^1$ $\qquad S^2$ $\qquad G_1 \times G_2$

$\quad\downarrow$

S^2

4. AS methods

give results for almost complex manifolds

no need for integrability

Need new method to distinguish

integrable from non-integrable

Non-abelian index theory ✓

Group symmetry

After hard work succeed with S^6

99% ✓