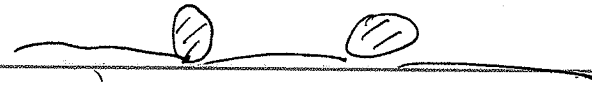
$t \longrightarrow$

(hard analysis)
Continuation: 

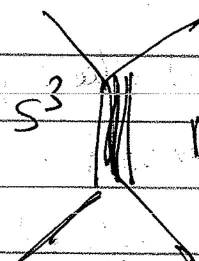
$\uparrow$
discs at various points all unknotted

FOOO get this up to be a chain map.

Idea: push $\nu^* K$ (not in S^3) off of S^3
using its deformations.

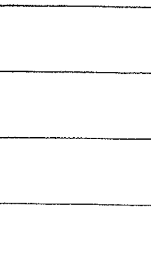
Gopakumar – Vafa: '98
large N duality:

$$\mathcal{O}(-1) + \mathcal{O}(-1) \longleftrightarrow$$
$$\downarrow$$
$$\mathbb{P}^1$$


S^3 N

$\mathbb{P}^1$ of size $N\lambda$ ← genus

$X^* = T^* S^3$
with $\boxed{N}$ A-Branes on S^3.


T^*S^3.

Witten: A-model on $T^* X^3$ ← 3 mflds.
w/ N Lag'n branes on base, the
top. A-model = $SU(N)$ C-S theory on S^3.

all hol. discs to base degenerate to graphs:
$SU(N)$ chern simons theory on S^3.

λ – genus counting parameter $\longleftrightarrow$ quantum parameter λ in CS theory

$\lambda = k \rightarrow (\lambda' = 2\pi i/(k+N)\ ?)$

So CS theory of $S^3 \xleftrightarrow{\text{CS duality}}$ A-model on $T^*S^3 \xleftrightarrow{\text{large } N} \mathcal{O}(-1) \oplus \mathcal{O}(-1) \to \mathbb{P}^1 \xleftrightarrow{\text{MS}}$ Riemann surface.

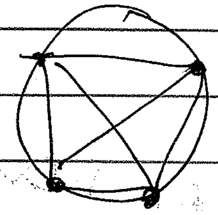
Computable if you know HOMFLY polynomial.

Chern-Simons $\leftrightarrow$ A-model duality $\quad T^*S^3$

Lag'n 0-section

Not just Morse trees!
Problem is, it includes
no marked points.

A_n:
$(n=7)$



all edges in circle b/tw $n+1$ vertices

$\binom{n+1}{2}$ indecomp objects = edges. Morphisms: intersections.

t structures: heart, abelian, n simple objects, ~~A~~ subtree here
given by

plus degrees making degree of homs between objects.

stability condition: t structure w/ n-numbers in upper half plane

H-N:
$E \neq 0 \in A$
$E = E_0 \subset \cdots \subset E_n = E$
w/ $F_i = E_i/E_{i-1}$
semistable,
$\phi(F_{i-1}) > \phi(F_i)$.

$\phi(E) = \mathrm{Arg}(Z(E)) \in (0,\pi]$

Stability: $\mathcal{T}$ triangulated, fixed homomorphism $cl: K_0(\mathcal{T}) \to \Gamma$

Γ f.g. group, stab. conditions:

- $Z: \Gamma \to \mathbb{C}$

- $A \subset \mathcal{T}$ heart of bdded $\mathcal{T}$ structure,

satisfying:

$\Rightarrow$ if $E \in A$ is semistable
for any $F \subseteq E \Rightarrow \phi(F) \leq \phi(E)$ (resp. $<$).

- Z a stab. condition on heart A: $Z(E) \in \mathbb{H} \cup \mathbb{R}_{<0}$ for $0 \neq E \in A$.

Harder-Narasimhan

- support property