

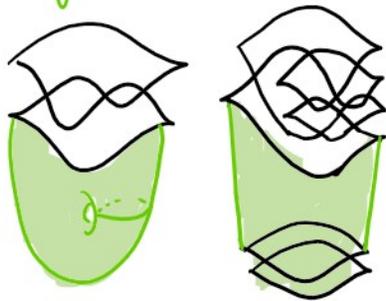
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Legendrian links and surfaces in contact 3 & 5-manifolds



Lagrangian fillings  
& cobordisms of  
Legendrians



Legendrian contact homology DGA  $(A(\Lambda; \mathbb{R}), \partial)$   
noncommutative differential graded algebra - Legendrian  
invariant such that fillings induce augmentations.



$(A(\Lambda; \mathbb{R}), \partial)$

$\downarrow \epsilon$   
 $(\mathbb{R}, 0)$

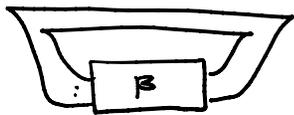
$\epsilon \circ \partial = 0$

Augmentation variety of  $\Lambda$  is given by  
 $\{ \epsilon \mid \epsilon \text{ is an augmentation of } (A(\Lambda; \mathbb{C}), \partial) \}$

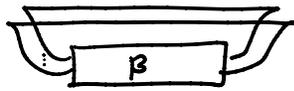
- they can have a cluster algebra structure
- related to HMS

Legendrians can have as many distinct Lagrangian fillings up to Hamiltonian isotopy  
(microlocal sheaf theory, cluster algebras, Legendrian contact DGA, weaves)

Legendrians related to braids:



rainbow closures of  $\beta \in Br_n^+$



(-1) closures of  $\beta \in Br_n^+$

Weinstein manifolds

- Symplectic structure plays nicely w/ Morse handlebody structure

⇒ symplectic topology encoded by Legendrians

Complex affine varieties have a Weinstein structure.

- Finding Weinstein handlebody diagrams is not easy
- Use Lagrangian fillings to construct closed exact Lagrangians