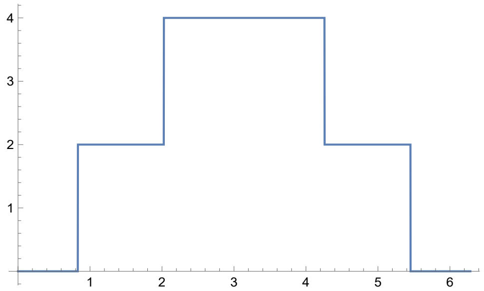
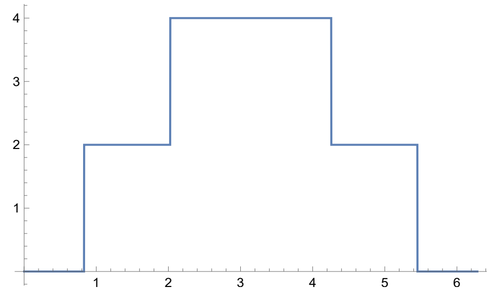
```
Plot[ω = e^(i t); u = Re[ω^(1/2)]; v = Re[ω];
 (MatrixSignature[A] - Writhe[K]) / 2,
 {t, 0, 2 π}]
```

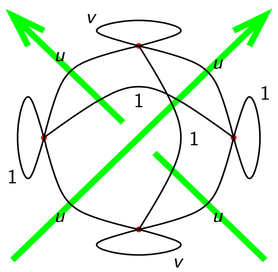


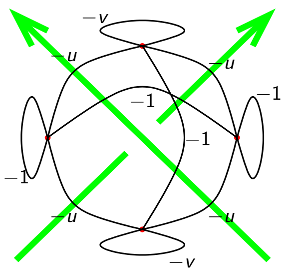

```
Plot[Bed[Knot[8, 2], e^(i t)], {t, 0, 2 π}]
```



Kashaev for Mathematicians.

For a knot K and a complex unit ω set $u = \Re(\omega^{1/2})$, $v = \Re(\omega)$, make an $F \times F$ matrix A with contributions

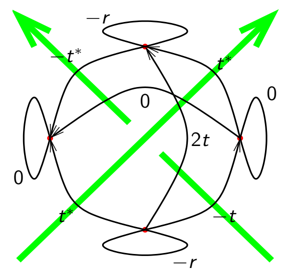


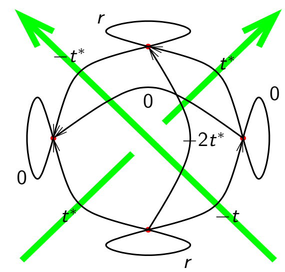


and output $\frac{1}{2}(\sigma(A) - w(K))$.

Bedlewo for Mathematicians.

For a knot K and a complex unit ω set $t = 1 - \omega$, $r = 2\Re(t)$, make an $F \times F$ matrix A with contributions





(conjugate if going against the flow) and output $\sigma(A)$.

Why are they equal?

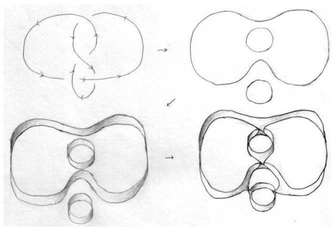
I dunno, yet note that

- Kashaev is over the $\mathbb{R}$eals, Bedlewo is over the $\mathbb{C}$omplex numbers.
- There's a factor of 2 between them, and a shift.

. . . so it's not merely a matrix manipulation.

Theorem. The Bedlewo program computes the Levine-Tristram signature of K at ω.

(Easy) **Proof.** Levine and Tristram tell us to look at $\sigma((1-\omega)L + (1-\omega^*)L^T)$, where L is the linking matrix for a Seifert surface S for K: $L_{ij} = \mathrm{lk}(\gamma_i, \gamma_j^+)$ where γ_i run over a basis of $H_1(S)$ and γ_i^+ is the pushout of γ_i. But signatures don't change if you run over and over-determined basis, and the faces make such and over-determined basis whose linking numbers are controlled by the crossings. The rest is details.



Art by Emily Redelmeier

Thank You!

Video and more at http://www.math.toronto.edu/~drorbn/Talks/CMS-2112/