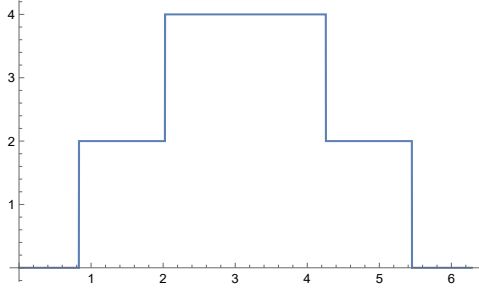
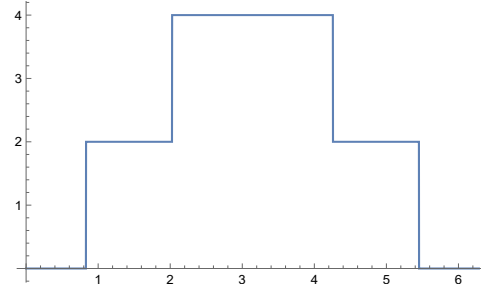


Plot [$\omega = e^{it}$; $u = \text{Re}[\omega^{1/2}]$; $v = \text{Re}[\omega]$; $-(\text{MatrixSignature}[A] - \text{Writhe}[K]) / 2$, $\{t, 0, 2\pi\}$]

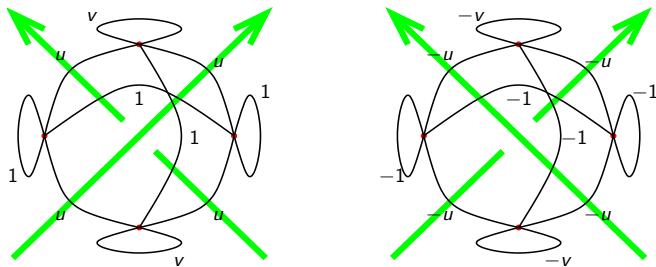


Plot [Bed[Knot[8, 2], e^{it}], $\{t, 0, 2\pi\}$]



Kashaev for Mathematicians.

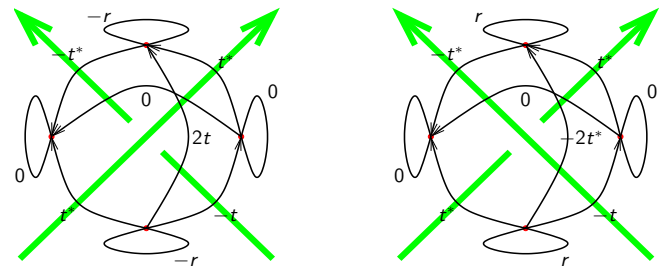
For a knot K and a complex unit ω set $u = \Re(\omega^{1/2})$, $v = \Re(\omega)$, make an $F \times F$ matrix A with contributions



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?

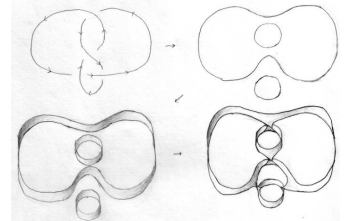
I dunno, yet note that

- ▶ 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 : $L_{ij} = \text{lk}(\gamma_i, \gamma_j^+)$ 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 an over-determined basis, and the faces make such an over-determined basis whose linking numbers are controlled by the crossings. The rest is details.



Art by Emily Redelmeier

Thank You!