An Adaptive Multivariate Point Null Test
Speed Presentation

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Joint work with Alex Luedtke and Marco Carone
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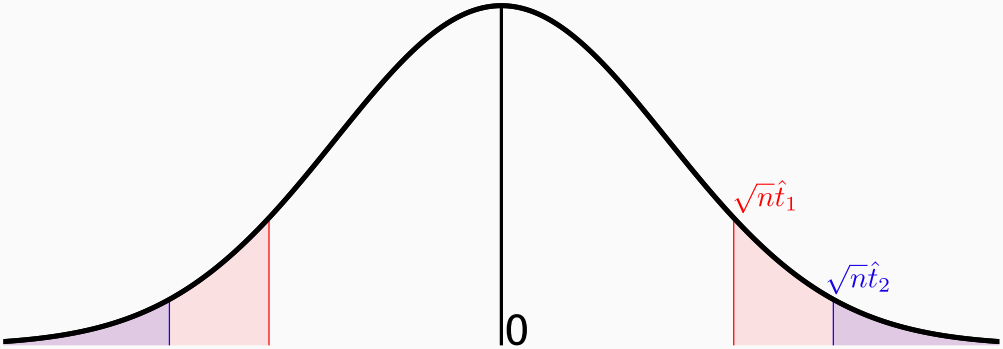
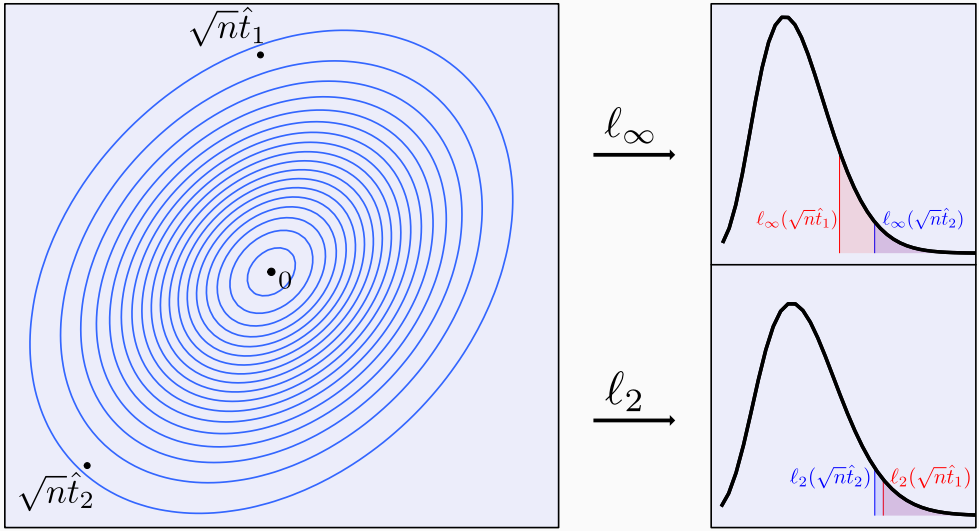
A univariate test

Let t be some population level parameter

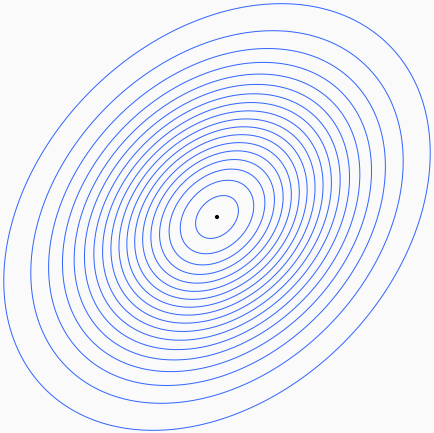
- We wish to test if $t = 0$.
- To conduct such a test, it is common to estimate t with some estimator, $\hat{t}$, and compare $\sqrt{n}\hat{t}$ to an estimate of the limiting distribution of $\sqrt{n}\hat{t}$ when $t = 0$.



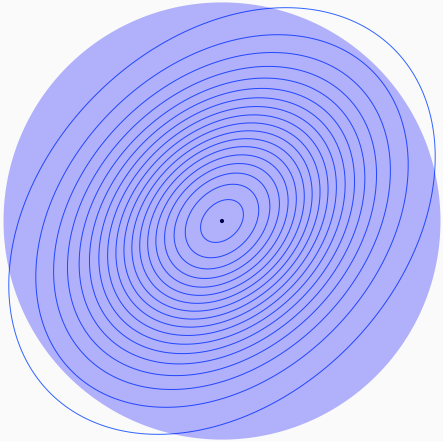
Dificulties in higher dimensions



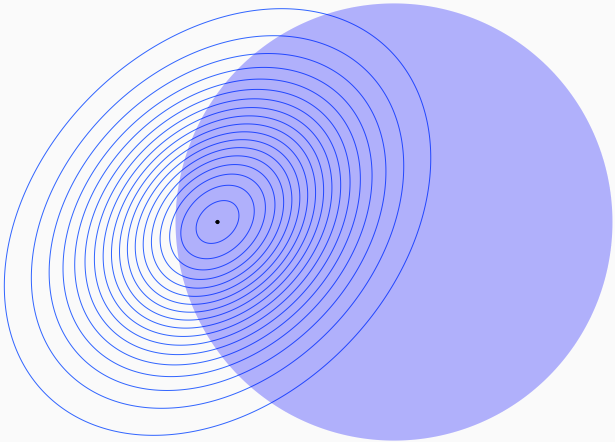
Estimating local power



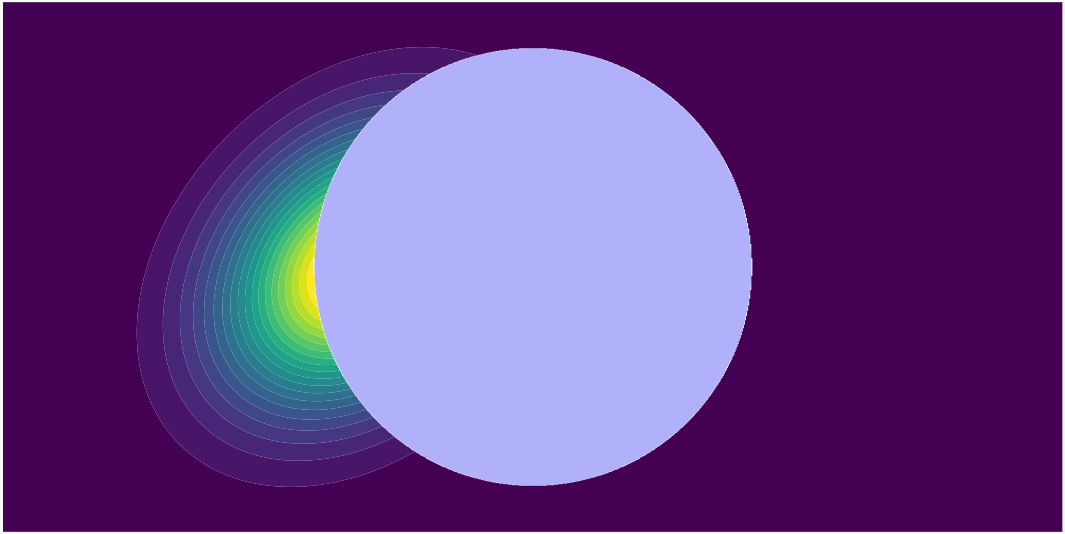
Estimating local power



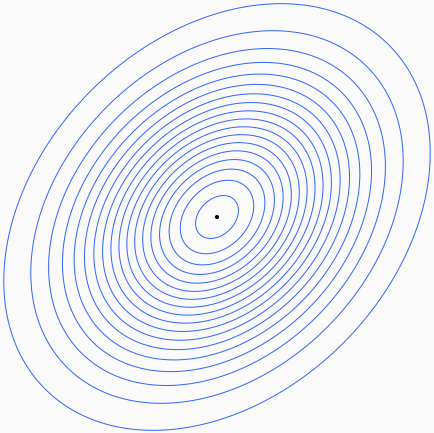
Estimating local power



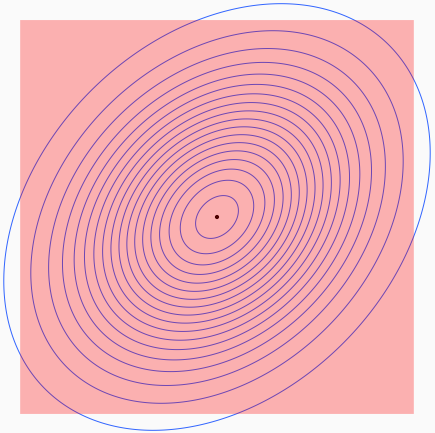
Estimating local power



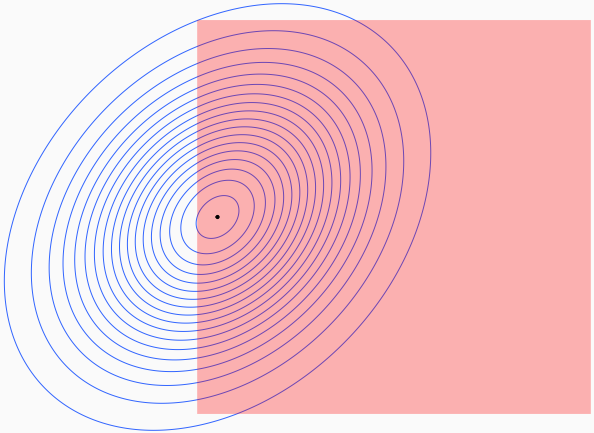
Estimating local power



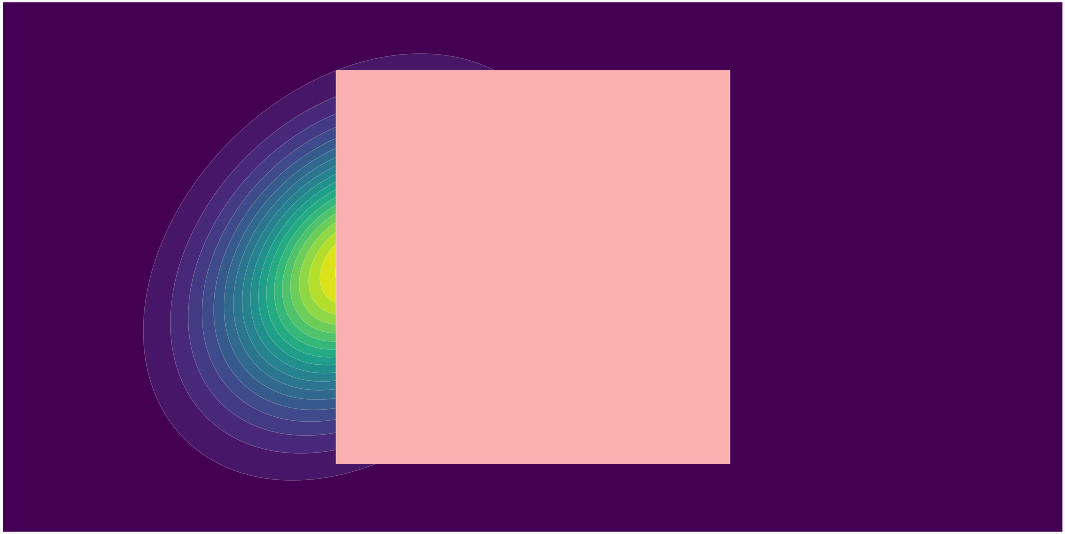
Estimating local power



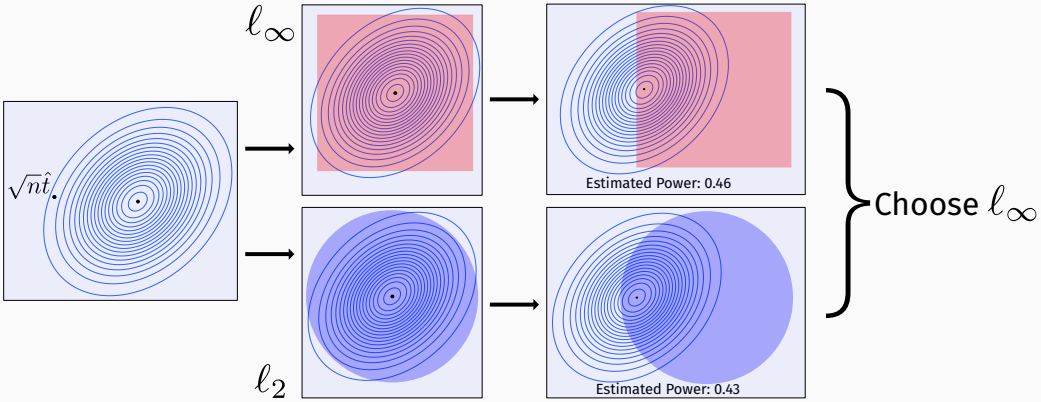
Estimating local power



Estimating local power



Our Estimator



Concluding remarks

Our framework allows for the construction of tests with useful theoretical guarantees for most data generating mechanism and most parameters of interest.

- Asymptotic Type-1 error control
- Power approaching 1 under any fixed alternative
- Power that is asymptotically greater than α under local alternatives

We also find via numerical examples that tests using our framework provide comparable performance to other modern methods in settings in which they exist, and shown the application of our framework in novel settings.

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