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A necessary and sufficient condition for a unique maximum with an application to potential games

Finn Christensen

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- In some contexts, " $\nabla f(x^*) = 0 \Rightarrow \det(-D^2 f(x^*)) > 0$ " iff there is a unique critical point that is a global maximum.
- This is an alternative to strict quasiconcavity which is only a sufficient condition.
- The result is applied to potential games and yields a new uniqueness theorem.
- The proof is an application of the Poincaré-Hopf Theorem from differential topology.

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