Accepted Manuscript

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

Finn Christensen

PII: S0165-1765(17)30424-X
DOI: https://doi.org/10.1016/j.econlet.2017.10.008
Reference: ECOLET 7804

To appear in: *Economics Letters*

Received date : 11 August 2017
Revised date : 27 September 2017
Accepted date : 6 October 2017

Please cite this article as: Christensen F., A necessary and sufficient condition for a unique maximum with an application to potential games. *Economics Letters* (2017), https://doi.org/10.1016/j.econlet.2017.10.008

***Highlights (for review)**

- In some contexts, "$\nabla f(x^*) = 0 \Rightarrow \det\left(-D^2 f(x^*)\right) > 0$" 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.