

5.5 Backward Induction and Petard's BGH Theorem

Given there are lions in the Sahara desert. We prove the statement

L(n): *It is always possible to capture n lions in the Sahara desert*

by the powerful technique of **Backward Induction**.

Induction step. $L(n+1)$ is manifestly true for sufficiently large n since they will be packed like sardines and have no room to escape. Trivially $L(n+1)$ implies $L(n)$ since having captured $n+1$ lions we can always set one free.

Basis. Just release n of the captured lions. Hence $L(1)$ is true.

The theorem follows by Backward Induction.

QED

The inspiration for lion hunting as a mathematical endeavour is H. Petard *An Introduction to the Mathematical Theory of Big Game Hunting*, American Mathematical Monthly, vol 45, 1938, pp. 446–447 (reprinted in the more accessible [51]). BI was introduced by Cohen [5] (which is also to be found in [51]). BI isn't listed in the web-sites below which give the latest on this hot research line, so perhaps this is its first application to big game hunting.

1. <http://abel.math.umu.se/~frankw/lion.html>.
2. http://kjartan.org/humor/math/huntin_lions.html
3. <http://users.ox.ac.uk/~invar/lions.html>
4. <http://www.opundo.com/mathbiggame.htm>
5. <http://www.att.net/~xocxoc/humor/biggame.htm>

[5] has a delightful coda from P.R.Halmos explaining who H.Petard was(n't)!

About the time Bourbaki was starting up, another group of wags invented E.S.Pondiczery, a purported member of the Royal Institute of Poldavia. The initials E.S.P, R.I.P were inspired by a projected but never written article on extra-sensory perception. Pondiczery's main work was on mathematical curiosa. His proudest accomplishment was the the only known use of a second-degree pseudonym. Submitting the paper on the mathematical theory of big-game hunting to The American Mathematical Monthly, Pondiczery asked in a covering letter that he be allowed to sign it with a pseudonym because of the obviously facetious nature of the material. The editor agreed, and the paper appeared (in 1938) under the name of H. Petard.

The word *petard* is derived from the Latin *pedere* through the French *péter* meaning to break wind, crack, or explode. A petard (circa 1598) was a conical or cylindrical (dustbin-lid shaped) case of metal containing an explosive that was exploded against a wall, drawbridge, ... in order to breach it. If things went wrong and you went up too, you were said to be “hoist by your own petard”.