

Introduction to belief functions, Lecture 2– Exercise

Thierry Dencœux

1. An oil company must decide whether or not to drill for oil. They are uncertain whether the hole will be dry (D), have a trickle of oil (T), or be a gusher (G). Drilling a hole costs \$70,000. The payoffs for hitting a gusher, a trickle or a dry hole are \$270,000, \$120,000, and \$0, respectively.
 - (a) Which act do we select using the Laplace, maximax, maximin criteria?
 - (b) Discuss the decision based on the Hurwicz criterion, for different values of the pessimism index.
 - (c) Based on seismic soundings, we have obtained the following mass function on $\Omega = \{D, T, G\}$:

$$m(\{D\}) = 0.1, \quad m(\{T, D\}) = 0.4, \quad m(\{G, T\}) = 0.2, \quad m(\Omega) = 0.3$$

Compute the lower and upper expected utilities for each of the two acts, as well as the pignistic expected utilities.

- (d) Discuss the decisions made using the generalized Hurwicz criterion, as a function of the pessimism index.