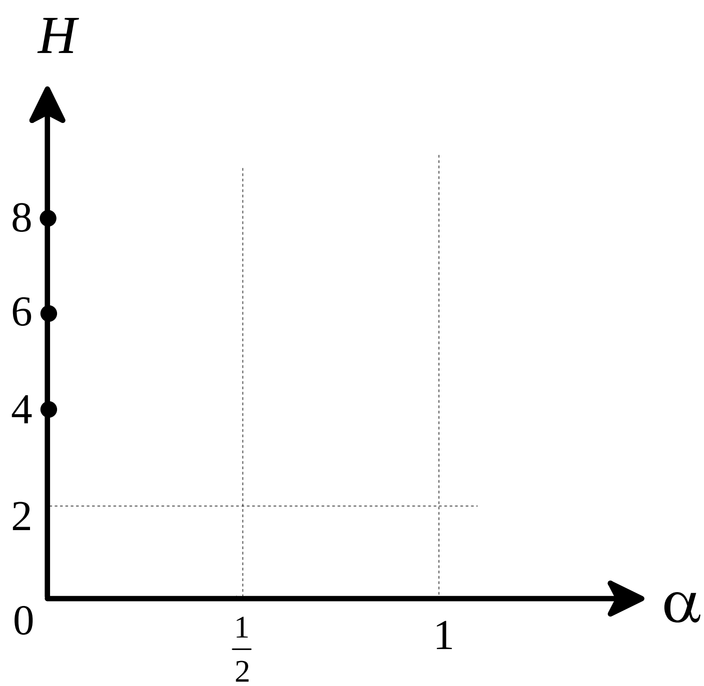
THE HURWICZ INDEX

	s_1	s_2	s_3
a_1	8	1	0
a_2	6	2	3
a_3	0	3	4

$$H_\alpha(a_1) = 0\alpha + 8(1-\alpha) = 8 - 8\alpha$$

$$H_\alpha(a_2) = 2\alpha + 6(1-\alpha) = 6 - 4\alpha$$

$$H_\alpha(a_3) = 0\alpha + 4(1-\alpha) = 4 - 4\alpha$$



Note: the Hurwicz index is invariant to allowed transformations of the utility function.

MinMax REGRET

	s_1	s_2	s_3
a_1	8	1	0
a_2	6	2	3
a_3	0	3	4

Define the **regret of taking action *a* under state *s*** as the difference between the maximum utility you could have got under state *s* (by taking the best action for that state) and the utility that you get with action *a*. We can then construct a **regret table:**

	s_1	s_2	s_3
a_1			
a_2			
a_3			

If I had chosen an alternative utility function, would I have reached the same conclusion in terms of MinMaxRegret? Consider a new decision problem:

	s_1	s_2	s_3
a_1	0	2	4
a_2	2	1	1
a_3	8	0	0

	s_1	s_2	s_3
a_1	z_1	z_2	z_3
a_2	z_4	z_5	z_6
a_3	z_7	z_8	z_9

we infer that the ranking is

	U	V
best	8	
	4	
	2	
	1	
worst	0	

Using U:

	s_1	s_2	s_3
a_1	0	2	4
a_2	2	1	1
a_3	8	0	0

regret:

	s_1	s_2	s_3
a_1			
a_2			
a_3			

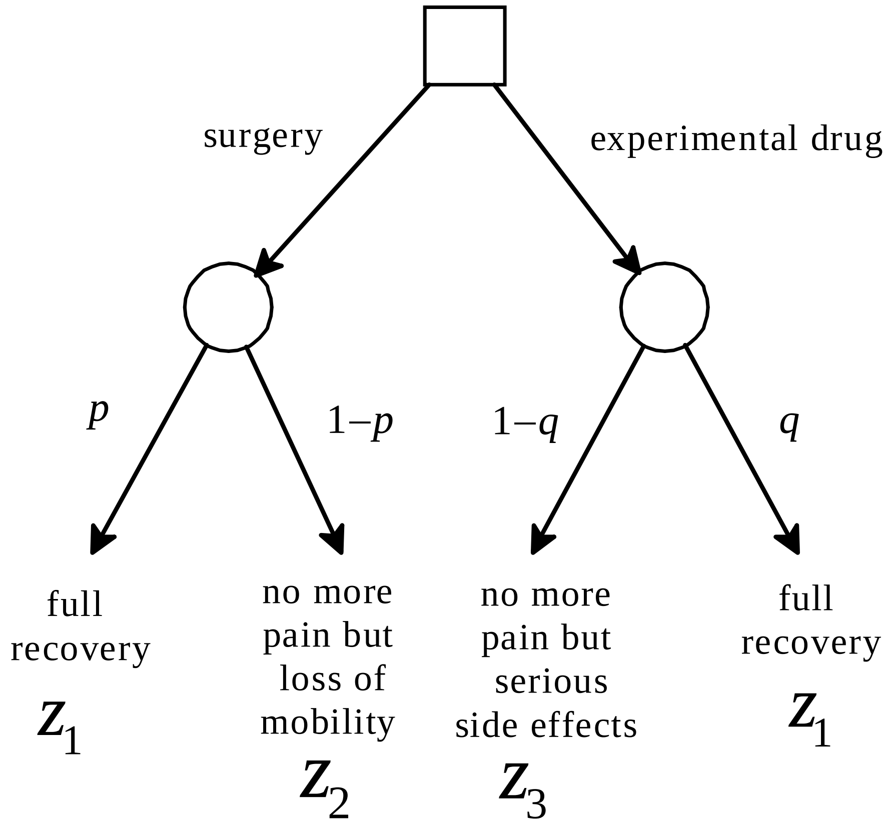
using V :

	s_1	s_2	s_3
a_1			
a_2			
a_3			

regret:

	s_1	s_2	s_3
a_1			
a_2			
a_3			

Example: knee injury



Suppose that:

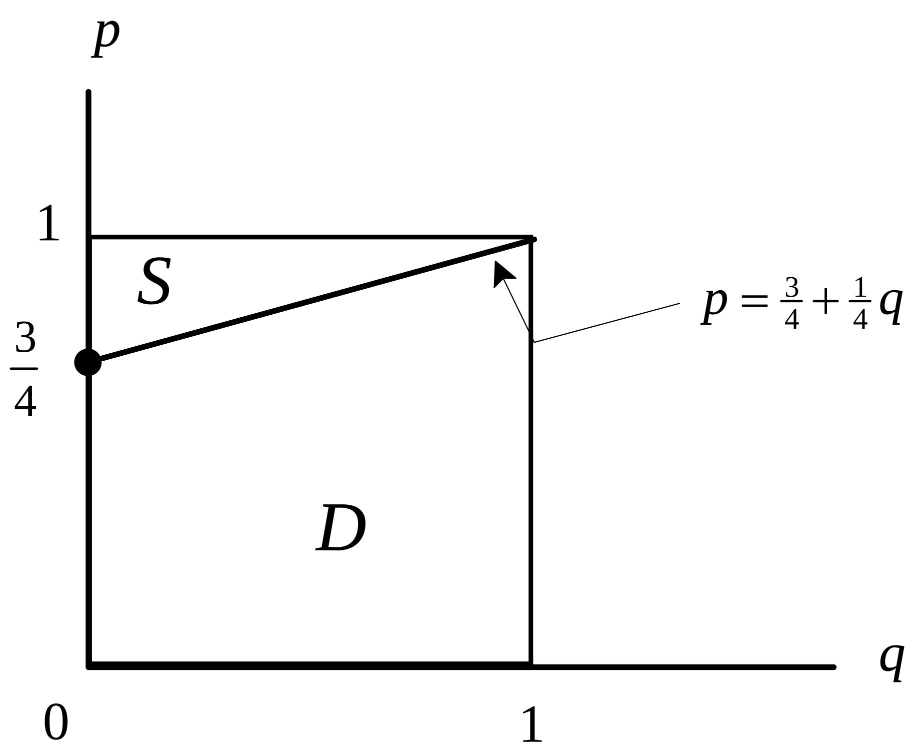
		U
best	z_1	100
	z_3	75
worst	z_2	0

The expected utility of surgery is

the expected utility of taking the drug is

So if you know the values of p and q then your optimal decision is:

- surgery if
- drug if
- either surgery or drug is



Suppose that the values of p and q are not available

	(S, D)	$(S, \neg D)$	$(\neg S, D)$	$(\neg S, \neg D)$
Surgery	z_1	z_1	z_2	z_2
Drug	z_1	z_3	z_1	z_3

		U
best	z_1	100
	z_3	75
worst	z_2	0

Replacing outcomes with utilities:

	(S,D)	$(S,\neg D)$	$(\neg S,D)$	$(\neg S,\neg D)$
Surgery				
Drug				

The corresponding regret table is:

	(S,D)	$(S,\neg D)$	$(\neg S,D)$	$(\neg S,\neg D)$
Surgery				
Drug				

What about the Hurwicz index?

$$H_\alpha(Drug) = \qquad\qquad H_\alpha(Surgery) =$$