

## Existence of Solutions Exercises

1) Prove that if the conditions of the theorem of the maximum are satisfied, then  $x^*(\theta)$  is closed-valued. Then prove that  $x^*(\theta)$  is compact-valued.

2) Let  $f$  be a continuous function on  $[a, b]$ . Prove that for all  $y \in (f(a), f(b))$ , there exists an  $c \in (a, b)$  such that  $f(c) = y$ .