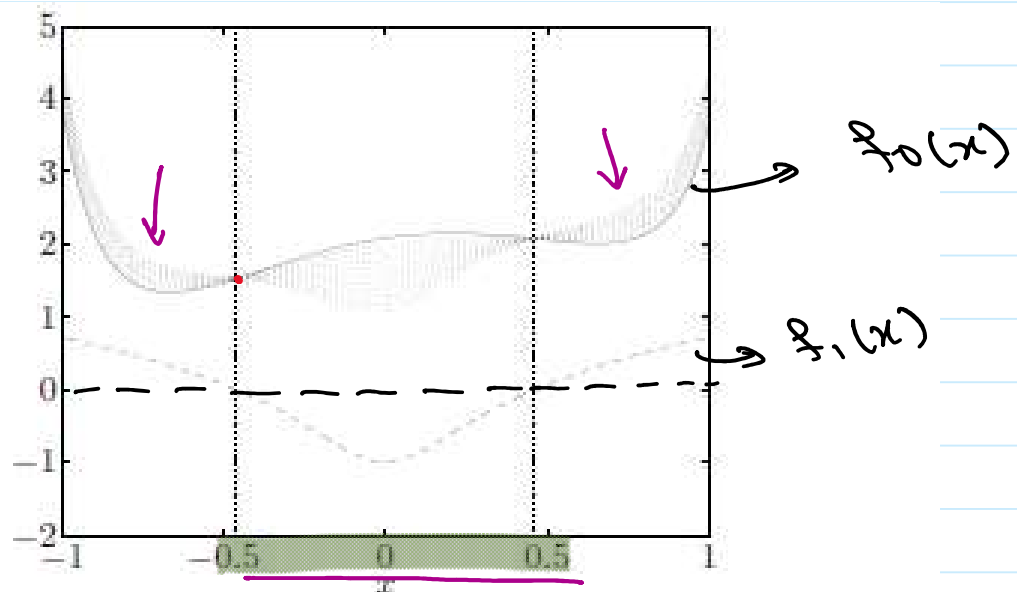
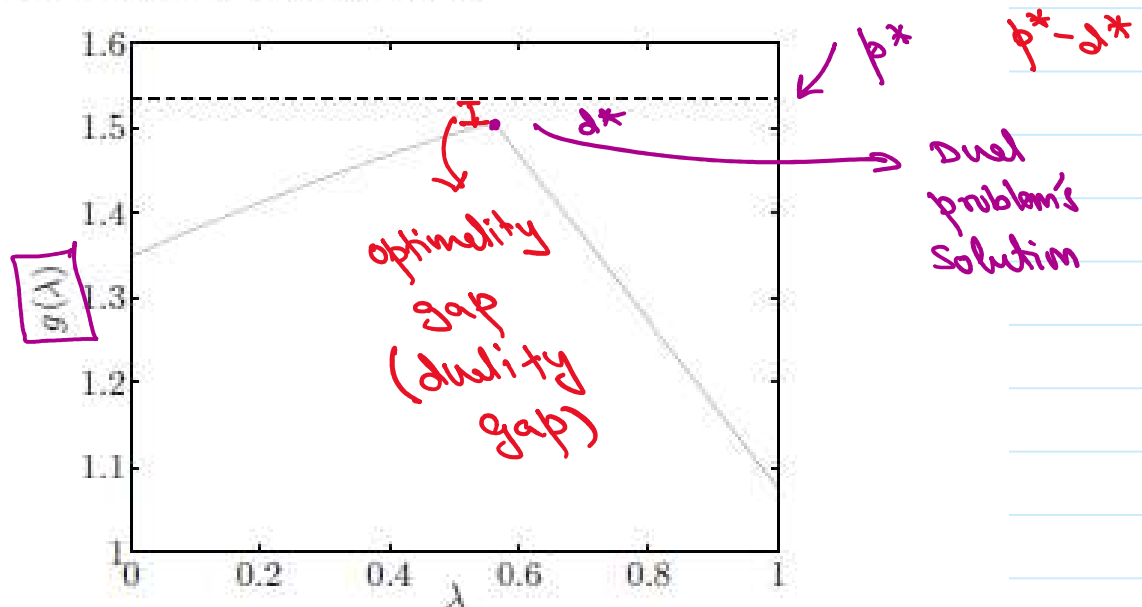


## Section 5.1.3

Tuesday, April 23, 2024 1:00 PM



**Figure 5.1** Lower bound from a dual feasible point. The solid curve shows the objective function  $f_0$ , and the dashed curve shows the constraint function  $f_1$ . The feasible set is the interval  $[-0.46, 0.46]$ , which is indicated by the two dotted vertical lines. The optimal point and value are  $x^* = -0.46$ ,  $p^* = 1.54$  (shown as a circle). The dotted curves show  $L(x, \lambda)$  for  $\lambda = 0.1, 0.2, \dots, 1.0$ . Each of these has a minimum value smaller than  $p^*$ , since on the feasible set (and for  $\lambda \geq 0$ ) we have  $L(x, \lambda) \leq f_0(x)$ .



**Figure 5.2** The dual function  $g$  for the problem in figure 5.1. Neither  $f_0$  nor  $f_1$  is convex, but the dual function is concave. The horizontal dashed line shows  $p^*$ , the optimal value of the problem.