Homework 2. Due Thursday, Sept. 23

All equation, figure, and section numbers refer to `2-OptProb&Methods4Classification.pdf`.

1. **(5 pts)** Derive the dual problem for (49)–(51), the case with soft margins.

2. **(5 pts)** Consider a Swiss Roll dataset shown Fig. 7(a). This dataset is generated by the provided Matlab code `stardata.m`. Design a nonlinear mapping to 2-dimensional or 3-dimensional feature space in which the blue and black sets are separable by a line or a plane. Visualize the data in the feature space so that it is apparent that there exists a line or a plane separating them. Submit a formula for your nonlinear map and your figure with the data mapped to the feature space. *You can also draw a linear divider but I am not requiring this at this time. I am also providing a text file with data set whose rows are $x_i(1), x_i(2), y_i$, $i = 1, \ldots, 600$, for the case you need it.*