

Differentiable manifolds – homework 7

Solve exercises 14, 15, 17, 20, 21, 22, 23 and 24 from Chapter 1 (Warner).

Solve exercise 6 from Chapter 2 (Warner).

Hint for exercise 6: You can consider instead the 2-parameter function

$$\beta(s, t) = Y_{-s}X_{-t}Y_sX_t.$$

Then you want to Taylor expand $f \circ \beta(s, t)$ in coordinates to get something similar to

$$f \circ \beta(s, t) = f(p) + s \cdot t \cdot \mathcal{L}_{[X, Y]}f + \text{higher order.}$$

From this the conclusion of the exercise follows.