MANIFOLDS: FALL 2014
EXERCISE 12

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Abstract. Guillemin-Pollack Chapter 3.1-3.3

Problem 1. *3.2.9, 3.2.14, 3.3.8, 3.3.10*

Problem 2.

(1) *Any* $\mathbb{C}^n$*, considered as the* $\mathbb{R}^{2n}$*, comes with a canonical orientation: choose a* $\mathbb{C}$*-basis* $\{v_1, ..., v_n\}$*, and take* $\{v_1, iv_1, ..., v_n, iv_n\}$ *as a positively oriented basis of* $\mathbb{R}^{2n}$*. Show that the resulting orientation of* $\mathbb{R}^{2n}$ *doesn't depend on the choice of* $\{v_1, ..., v_n\}$*.*

(2) *Let* $P : \mathbb{C} \to \mathbb{C}$ *be a polynomial of degree* m*. It defines a mapping* $\tilde{P} : \mathbb{C}P^1 \to \mathbb{C}P^1$ *by* $\tilde{P}(z) = P(z)$ *for* $z \neq \infty$ *and* $\tilde{P}(\infty) = \infty$*. Show that the degree of* $\tilde{P}$ *as a mapping of* $\mathbb{S}^2$ *to itself is equal to* m*.*

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