Local results on tangency and transversality

CHANGES TO §1.3 Some reasoning is needed to justify the condition $g^*\omega = \pm\omega$. Here is what we need:

The natural notion of structure preserving diffeomorphism $f: M \to M$ for a contact structure, codimension 1 foliation, or indeed any hyperplane field on a manifold, is that the tangent space map of the diffeomorphism f sends the hyperplane H_x at $x \in M$ to the hyperplane $H_{f(x)}$ at $f(x)$. If the hyperplane field is defined by a smooth 1-form ω (which is true for contact structures and at least locally for foliations near a point fixed by f*), then the structure preserving condition is equivalent to $f^*\omega = h\cdot\omega$ where $h: M \longrightarrow \mathbb{R}$ is smooth and never zero.** Assume M is connected, so that h is either always positive or negative.

* if f is ~~has~~ periodic of finite order

** Note ω & $h\cdot\omega$ define the same hyperplane field.

PROPOSITION. Suppose ~~f is periodic~~ G is a finite group acting smoothly on M and $\mathcal{H}$ is a smooth hyperplane field on M which is G-invariant.