Background for holomorphic curve analysis

Note Title 8/4/2009

- Def^{ns} of Banach space (Banach manifold, Banach bundle)
  bounded linear operator
- implicit function thm on Banach spaces (on Banach bundle) e.g. MS A.3.3

Fredholm theory (e.g. Mrowka script; McDuff-Salamon A.1, A.3)

- Def^{ns} of compact operator
  Fredholm operator, index
- stability of Fredholmness, index – under compact perturbation
  – along paths of Fredholm operators
- certain estimates imply pre-Fredholmness (Mrowka 16.17 resp. MS A.1.1)

Sobolev spaces (e.g. McDuff-Salamon B.1)

- $W^{k,p}(X,Y)$ for $X \subset \mathbb{R}^n$, $Y = \mathbb{R}^m$ is a Banach space
  (or X manifold, $Y \to X$ vector bundle)
- ∘ $W^{k,p}(X,Y)$ for X, Y manifolds, $kp > \dim X$ is a Banach manifold
- Sobolev embeddings $W^{k,p}(X,Y) \hookrightarrow \mathcal{C}^0(X,Y)$ for $kp > \dim X$

  $W^{1,p}(X,Y) \hookrightarrow L^q(X,Y)$ for $\frac{1}{q} \geq \frac{1}{p} - \frac{1}{\dim X}$
- Rellich's thm: Sobolev embeddings for strict inequality are compact