Quillen's bundle

$$\begin{tikzcd} \Psi^{-\infty}(X) \arrow[r] & \Psi^{\mathbb{Z}}(X) \arrow[r] & A^{\mathbb{Z}}(X) \\ & \mathrm{Diff}^{\mathbb{Z}}(X) \arrow[u, hook] \arrow[ur, hook] & \end{tikzcd}$$

$\mathcal{D} \in \mathrm{Diff}^1(X)$ a Dirac operator

- $\mathcal{D}^2$ = Laplacian + l.o.t.
- order term in $\mathcal{D}$ determined by principal part.

$\mathcal{D}_y^+$ a family of Dirac operators

<u>assume</u> $\mathrm{ind}(\mathcal{D}_y) = 0$.

$N_y^+ \subset C^\infty(X)$ – null space

$N_y^- \subset C^\infty(X)$ – orthocomp. of range

$L_y \cong (N_y^+)^{\wedge \max} \otimes (N_y^-)^{-\wedge \max}$ is smooth