

**Lemma 7.3.8** *Let  $\{U_j\}$  be an open covering of the manifold  $M$ .*

- (a) *Let  $P, Q \in \Psi^d(M)$  be such that  $P_{U_j} - Q_{U_j} \in \Psi^{-\infty}(U_j)$  for all  $j$ . Then  $P - Q \in \Psi^{-\infty}(M)$ .*
- (b) *Assume that for each  $j$  a pseudo-differential operator  $P_j \in \Psi^d(U_j)$  is given. Assume furthermore that  $(P_i)_{(U_i \cap U_j)} = (P_j)_{(U_i \cap U_j)}$  for all indices  $i, j$  with  $U_i \cap U_j \neq \emptyset$ . Then there exist a  $P \in \Psi^d(M)$  such that  $P_{U_j} - P_j \in \Psi^{-\infty}(U_j)$  for all  $j$ . The operator  $P$  is uniquely determined modulo  $\Psi^{-\infty}(M)$ .*