ABSTRACT. Let $T_i (i = 1, 2, ..., N)$ be nonexpansive mappings on a Hilbert sapce H, and let $\Theta : H \to R \cup \{\infty\}$ be a function which has a uniformly strongly positive and uniformly bounded second (Fréchet) derivative over the convex hull of $T_i(H)$ for some i. We first prove thet Θ has a unique minimum over the intersection of the fixed point sets of all the T_i's at some point u^*. Then a cyclic hybrid steepest descent algorithm is proposed and we prove that it converges to u^*. This generalizes some recent results of Wittmann (1992), Combettes (1995), Bauschke (1996), and Yamada, Ogura, Yamashita, and Sakaniwa (1997).

In particular, the minimization of Θ over the intersection $\cap_1^N C_i$ of closed convex sets C_i can be handled by taking T_i to be the metric projection P_{C_i} onto C_i. We also propose a modification of our algorithm to handle the *inconsistent* case (i.e., when $\cap_1^N C_i$ is empty) as well.