Given a set $X$ of vertices, we can use depth-first search to determine if $G - X$ has no cycles. Thus *undirected feedback set* is in NP.

We now show that *vertex cover* can be reduced to *undirected feedback set*. Given a graph $G = (V, E)$ and integer $k$, construct a graph $G' = (V', E')$ in which each edge $(u, v) \in E$ is replaced by the four edges $(u, x^1_{uv})$, $(u, x^2_{uv})$, $(v, x^1_{uv})$, and $(v, x^2_{uv})$ for new vertices $x^i_{uv}$ that appear only incident to these edges. Now, suppose that $X$ is a vertex cover of $G$. Then viewing $X$ as a subset of $V'$, it is easy to verify that $G' - X$ has no cycles. Conversely, suppose that $Y$ is a feedback set of $G'$ of minimum cardinality. We may choose $Y$ so that it contains no vertex of the form $x^i_{uv}$ — for it does, then $Y \cup \{u\} - \{x^i_{uv}\}$ is a feedback set of no greater cardinality. Thus, we may view $Y$ as a subset of $V$. For every edge $(u, v) \in E$, $Y$ must intersect the four-node cycle formed by $u, v, x^1_{uv}$, and $x^2_{uv}$; since we have chosen $Y$ so that it contains no node of the form $x^i_{uv}$, it follows that $Y$ contains one of $u$ or $v$. Thus, $Y$ is a vertex cover of $G$.

[1] ex867.590.603