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Radhika Ramamurthi*, 333 S. Twin Oaks Valley Road, Department of Mathematics, San Marcos, CA 92096, and **Andre Kundgen** and **Michael Pelsmajer**. *Finding minors in graphs with a given path structure.*

A *scheme* of a graph H in a graph G with $V(H) \subseteq V(G)$ is a collection of $|E(H)|$ paths, consisting of one u, v -path in G for each edge uv in H . An H -subdivision corresponds to a scheme in which the paths are internally vertex disjoint, whereas an H -immersion corresponds to a scheme in which the paths are edge-disjoint.

The study of H -schemes that force G to have an H -minor naturally leads to H -immersions with the additional property that all paths in the scheme that contain the same vertex must have a common endpoint. If H has the property that every graph G with such an H -immersion contains a rooted H -minor, then we call H *contractible*.

We show that $K_4, K_{2,3}$, trees and cycles are contractible, but that complete graphs on more than 6 vertices as well as many subdivisions of $K_{2,3}$ are not contractible. (Received September 23, 2009)