Transversally biharmonic maps between foliated Riemannian manifolds

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We generalize the notion of transversally harmonic maps between foliated Riemannian manifolds into transversally biharmonic maps. We show that a transversally biharmonic map into a foliated manifold of non-positive transverse curvature is transversally harmonic. Then we construct an example of a transversally biharmonic map into a foliated manifold of positive transverse curvature. We also prove that if $f$ is a stable transversally biharmonic map into a foliated manifold of positive constant transverse sectional curvature and $f$ satisfies the transverse conservation law, then $f$ is a transversally harmonic map.