1062-53-54 **Scott A. Wolpert*** (saw@math.umd.edu), Department of Mathematics, College Park, MD 20742.
Geodesic-length functions and the Weil-Petersson curvature tensor (available on ArXiv).

Liu-Sun-Yau use expansions for WP curvature for algebro-geometric results about the moduli space of Riemann surfaces. Burns-Masur-Wilkinson use expansions for geodesic-length functions ℓ_* and curvature tensor in their proof of WP geodesic flow ergodicity. Cavendish-Parlier use a bound for curvature to find the moduli space asymptotic WP diameter.

We present results for the curvature tensor using gradients $\lambda_a = grad\, \ell_a^{1/2}$: $R(\lambda_a, \lambda_a, \ , \ ) = 3|\langle\lambda_a, \ \rangle|^2/4\pi\ell_a \ + O(\ell_a)$ and disjoint geodesics, at most pairs coinciding, $R(\lambda_a, \lambda_b, \lambda_c, \lambda_d) = O((\ell_a\ell_b\ell_c\ell_d)^{1/2})$. For the surface systole, the sectional curvatures at S are at least $-(3+\epsilon)/\pi\Lambda(S)$ and, except for diagonal evaluation, the tensor evaluated for geodesic-lengths for a pants decomposition is continuous near the corresponding stratum of the augmented Teichmüller space. The tensor also has an asymptotic factorization corresponding to the nodes and components of the limiting noded surface. A classification is given for limits of almost flat tangent sections. The techniques are applied to find the asymptotic maximal ratio $(2/\pi\Lambda(S))^{1/2}$ of L^∞ and L^2 norms for holomorphic qds $Q(S)$. (Received July 21, 2010)