

HW 8 (20 points) - To be handed by Friday, Oct 25 in
the class or by email

1. (20 points) (Problem 10-1 in Lee) Suppose (M, g) is a Riemannian manifold and $p \in M$. Show that in geodesic normal coordinates at p , $g_{ij}(x) = \delta_{ij} - \frac{1}{3} \sum_{k,l} R_{iklj}(p)x^k x^l + O(|x|^3)$. (Hint: Take a radial geodesic and linear Jacobi field. Compute the first four derivatives of $|J(t)|^2$ in two different ways.)