

• We wish to prove $\text{laplacian}(\phi) = \frac{1}{\Omega} \sum_i \partial_{g_i} \left(\frac{\Omega}{h_i^2} \partial_{g_i} \phi \right)$
using N04 & N06

$$\text{Start with grad} \phi = \sum_i \frac{\hat{e}_i}{h_i} \frac{\partial}{\partial g_i} \phi = \vec{F}$$

$$\text{Now use } \text{div}(\vec{F}) = \frac{1}{\Omega} \sum_i \frac{\partial}{\partial g_i} \left(\frac{\Omega F_i}{h_i} \right)$$

Combining yields:

$$\text{div}(\text{grad}(\phi)) = \frac{1}{\Omega} \sum_i \frac{\partial}{\partial g_i} \left(\frac{\Omega}{h_i^2} \frac{\partial}{\partial g_i} \phi \right)$$