

1. **SPHERICAL COORDINATES, III**

Consider the sphere of radius r , in spherical coordinates (θ, ϕ) , with line element

$$ds^2 = r^2 (d\theta^2 + \sin^2 \theta d\phi^2)$$

- (a) Find the connection 1-forms ω^i_j in this basis.
- (b) Compute $\Omega^i_j = d\omega^i_j + \omega^i_k \wedge \omega^k_j$ for $i, j = 1, 2$ (and where there is an implicit sum over k).
- (c) (**Optional for MTH 434/Required for MTH 534**)
Compare your answers (and your computations) with those from the previous homework assignment.