In[1]:=
```
ClearAll["Global`*"]
coordinateList = {θ, ϕ}; (*(θ,ϕ) in terms of (θ,ϕ)*)

(* Define g_μν *)
g = {{1, 0}, {0, Sin[θ]^2}};

(* Initialize Γ^μ_νρ as rank 3 tensor *)
tmp[a_, b_, c_] := 0;
Γ = Array[tmp, {2, 2, 2}];

(* Loop over indices in Γ^μ_νρ *)
Do[
 Do[
  Do[
   Do[
    xλ = coordinateList[[λ]];
    xμ = coordinateList[[μ]];
    xν = coordinateList[[ν]];

    Γ[[σ, λ, μ]] += 1/2 (Inverse[g])[[ν, σ]] (∂_xλ g[[μ, ν]] + ∂_xμ g[[λ, ν]] - ∂_xν g[[μ, λ]]);
    (* Γ^μ_νρ=1/2 g_νσ(∂g_μν/∂x^λ + ∂g_λν/∂x^μ - ∂g_μλ/∂x^ν) *),
    {ν, {1, 2}}],
   {μ, {1, 2}}],
  {λ, {1, 2}}],
 {σ, {1, 2}}]

Print["Γ^θ_νρ = ", MatrixForm[FullSimplify[Γ[[1]]]]]
Print["Γ^ϕ_νρ = ", MatrixForm[FullSimplify[Γ[[2]]]]]
```

$$\Gamma^{\theta}{}_{\nu\rho} = \begin{pmatrix} 0 & 0 \\ 0 & -\text{Cos}[\theta]\,\text{Sin}[\theta] \end{pmatrix}$$

$$\Gamma^{\phi}{}_{\nu\rho} = \begin{pmatrix} 0 & \text{Cot}[\theta] \\ \text{Cot}[\theta] & 0 \end{pmatrix}$$