```
%Met la dimention ici
n = 4;

x = sym("x", [1 n])

%les constantes/variables
G = sym("G");
M = sym("M");
c = sym("c");
Rs = sym("Rs");

%Rentre la métrique ici
g = [
    -(1-Rs/x(2)), 0, 0, 0;
    0, 1/(1-Rs/x(2)), 0, 0;
    0, 0, x(2)^2, 0;
    0, 0, 0, x(2)^2 * sin(x(3))^2;
]

ig = inv(g)

Gamma = g;

for i = 1:n
    Gamma(:,:,i) = zeros(n,n);
end

for gamma = 1:n
    for alpha = 1:n
        for beta = 1:n
            tmp0 = 0;
            for m = 1:n
                tmp0 = tmp0 + 0.5 * ig(gamma, m) * (diff(g(m,alpha), x(beta))
+ diff(g(m, beta), x(alpha)) - diff(g(alpha, beta), x(m)));
            end
            Gamma(alpha, beta, gamma) = simplify(tmp0);
        end
    end
end

Gamma


gd = det(g)



Ri = g;

for mu = 1:n
    for nu = 1:n
        tmp1 = 0;
```

```
        tmp2 = 0;
        tmp3 = 0;
        tmp4 = 0;
        for alpha = 1:n
            tmp1 = tmp1 + diff(Gamma(mu, nu, alpha), x(alpha));
            tmp3 = tmp3 + Gamma(mu, nu, alpha) * diff(log(sqrt(-gd)),
x(alpha));
            for beta = 1:n
                tmp2 = tmp2 + Gamma(alpha, mu, beta) * Gamma(beta, nu, alpha);
            end
        end
        Ri(mu,nu) = simplify(- diff(diff(log(sqrt(-gd)),x(nu)), x(mu)) + tmp1
- tmp2 + tmp3);
    end
end

Ri

courbureScalaire = 0;
for mu = 1:n
    for nu = 1:n
        courbureScalaire = courbureScalaire + ig(mu, nu) * Ri(mu, nu);
    end
end

courbureScalaire
```

x =

[x1, x2, x3, x4]

g =

```
[Rs/x2 - 1,               0,    0,               0]
[        0, -1/(Rs/x2 - 1),    0,               0]
[        0,               0, x2^2,               0]
[        0,               0,    0, x2^2*sin(x3)^2]
```

ig =

```
[x2/(Rs - x2),             0,      0,                  0]
[           0, -(Rs - x2)/x2,      0,                  0]
[           0,             0, 1/x2^2,                 0]
[           0,             0,      0, 1/(x2^2*sin(x3)^2)]
```

Gamma(:,:,1) =

```
[                   0, -Rs/(2*x2*(Rs - x2)), 0, 0]
[-Rs/(2*x2*(Rs - x2)),                    0, 0, 0]
[                   0,                    0, 0, 0]
```

```
[                   0,                    0, 0, 0]
```

```
Gamma(:,:,2) =

[-(Rs*(Rs - x2))/(2*x2^3),                    0,       0,                    0]
[                       0, Rs/(2*x2*(Rs - x2)),       0,                    0]
[                       0,                    0, Rs - x2,                    0]
[                       0,                    0,       0, sin(x3)^2*(Rs - x2)]
```

```
Gamma(:,:,3) =

[0,    0,    0,            0]
[0,    0, 1/x2,            0]
[0, 1/x2,    0,            0]
[0,    0,    0, -sin(2*x3)/2]
```

```
Gamma(:,:,4) =

[0,    0,               0,              0]
[0,    0,               0,           1/x2]
[0,    0,               0, cos(x3)/sin(x3)]
[0, 1/x2, cos(x3)/sin(x3),              0]
```

```
gd =

-x2^4*sin(x3)^2
```

```
Ri =

[0, 0, 0, 0]
[0, 0, 0, 0]
[0, 0, 0, 0]
[0, 0, 0, 0]
```

```
courbureScalaire =

0
```

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