Problem 4

In[1]:=
```
M = {{-γ, -δ, 0}, {δ, -γ, 0}, {0, 0, -γ2}};
R[t_] = {{u[t], v[t], w[t]}}^T;
```

In[4]:=
```
r = (R[t] /. DSolve[
        {D[R[t], t] == M.R[t] - {{0, 0, γ2}}^T, R[0] == {{0, 1, 0}}^T}, {u, v, w}, t])[[1]];
```

In[8]:=
```
RotationMatrix[π/2, {1, 0, 0}].r // MatrixForm
```

Out[8]//MatrixForm=

$$\begin{pmatrix} -e^{-t\gamma}\,\text{Sin}[t\,\delta] \\ e^{-t\gamma_2}\left(-1+e^{t\gamma_2}\right) \\ e^{-t\gamma}\,\text{Cos}[t\,\delta] \end{pmatrix}$$