Circuitos Electricos II

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Soluciones propuestas para los ejercicios del taller 14

Simulación

Dado el circuito resistivo,

$$R_1 = 10\Omega, \quad R_2 = 20\Omega, \quad R_3 = 50\Omega, \quad R_4 = 100\Omega$$

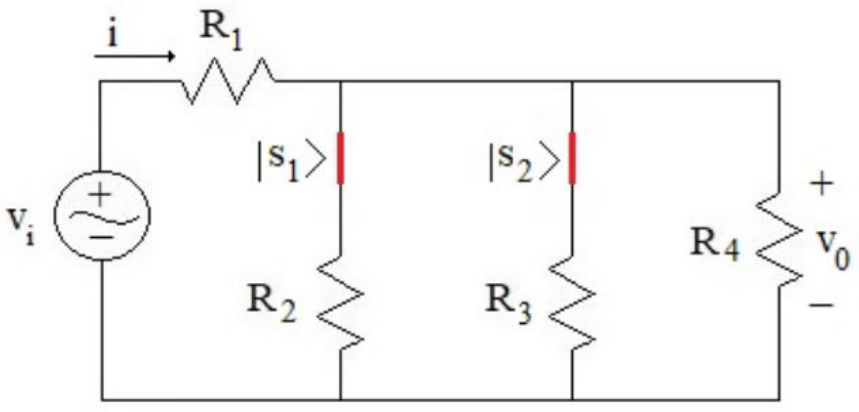


Figure: Circuito resistivo reconfigurable con los interruptores s_1, s_2.

La señal de control, externa al circuito, y su codificación, se muestran a continuación.

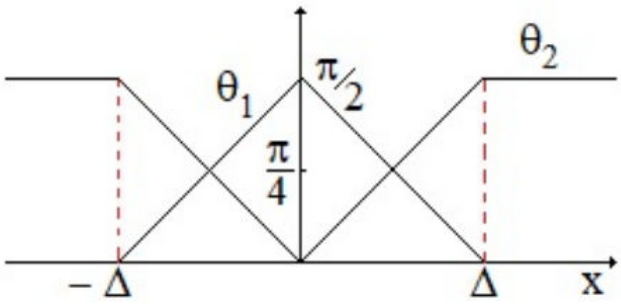


Figure: La señal de control x se codifica como θ_1, θ_2.

Cuando las probabilidades son menores a 0.5, el estado de los interruptores es $|s_2 s_1> = |11>$, $|0>$ abierto y $|1>$ cerrado. Al aplicar la señal de control, el estado de los interruptores $|s_2 s_1>$ cambia,

$$
\begin{aligned}
&|00>, \quad p_1 > 0.5 \\
&|01>, \quad p_2 > 0.5 \\
&|10>, \quad p_3 > 0.5 \\
&|11>, \quad p_4 > 0.5
\end{aligned}
$$

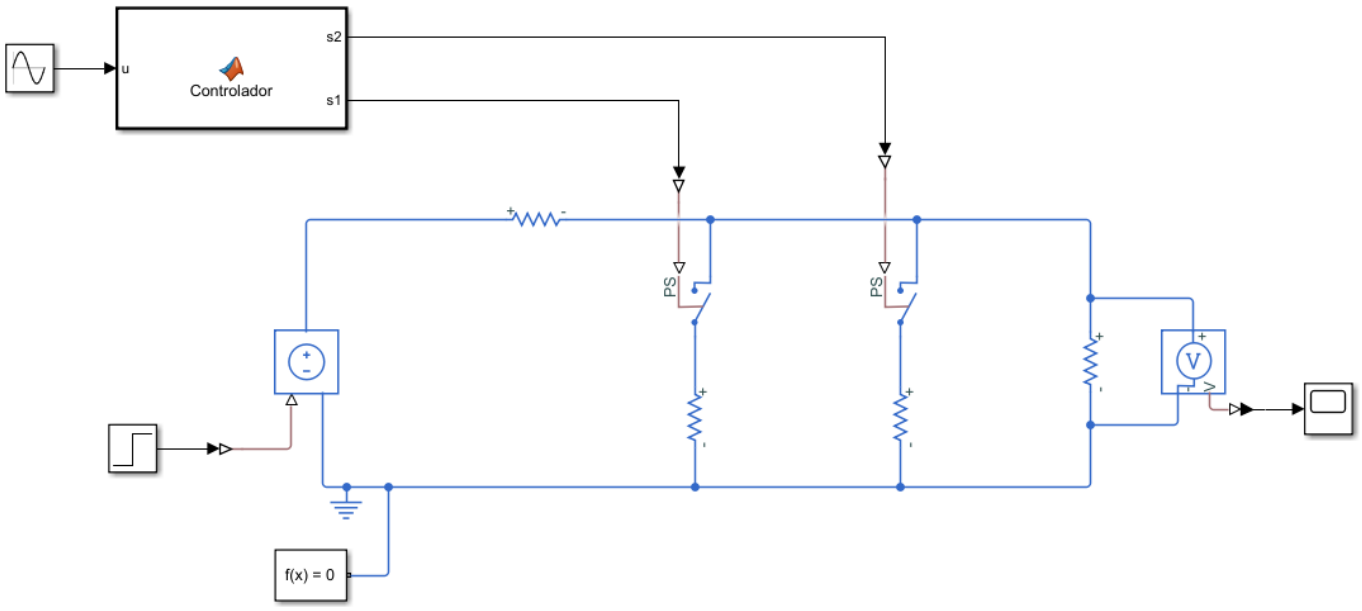
Donde,

$$
\begin{aligned}
p_1(t) &= [\cos\theta_1(t)\cos\theta_2(t)]^2 \\
p_2(t) &= [\cos\theta_1(t)\sin\theta_2(t)]^2 \\
p_3(t) &= [\sin\theta_1(t)\cos\theta_2(t)]^2 \\
p_4(t) &= [\sin\theta_1(t)\sin\theta_2(t)]^2
\end{aligned}
$$

Dibujar el voltaje de salida $v_0(t)$ para entrada escalón unitario, $v_i(t) = 1.0V$, cuando la señal de control y los parámetros son,

$$
\begin{aligned}
x(t) &= A\sin\omega t \\
\Delta &= \{0.1, 1.0\}, \quad A = \{1.0, 10.0\}, \quad \omega = \{2.0, 5.0\} rad/s
\end{aligned}
$$

Simulacion




```
%Codigo del controlador

% function [s2, s1] = Controlador(u)
```

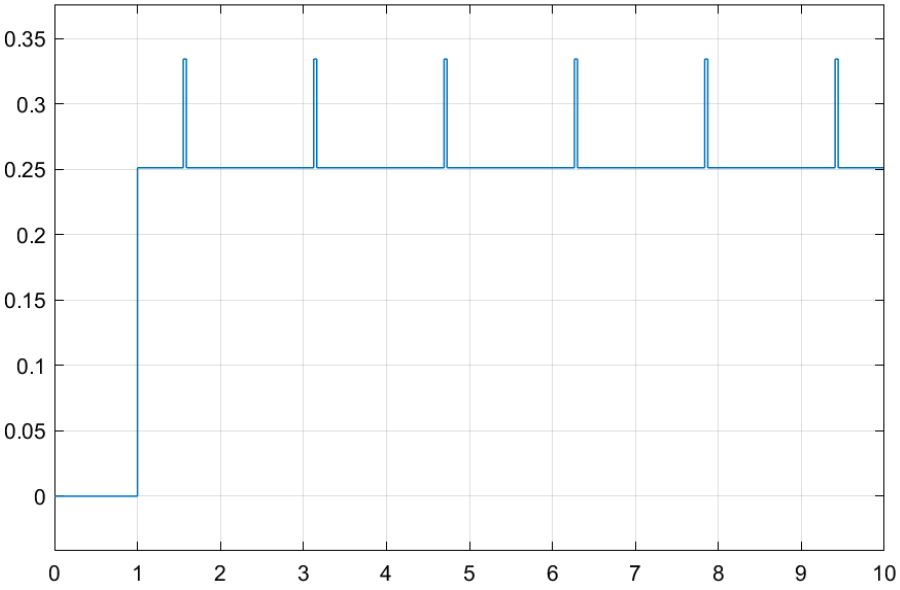
```
%
%     delta = 0.1;
%
%         if u < -delta
%             theta_1 = 0;
%             theta_2 = pi/2;
%
%         elseif ( u >= -delta) && (u < 0)
%             theta_1 = (pi/2)*((u/delta)+1);
%             theta_2 = -(pi/2)*(u/delta);
%
%         elseif u == 0
%             theta_1 = pi/2;
%             theta_2 = 0;
%
%         elseif (u > 0) && (u <= delta)
%             theta_1 = (pi/2)*(-(u/delta)+1);
%             theta_2 = (pi/2)*(u/delta);
%
%         elseif u > delta
%             theta_1 = 0;
%             theta_2 = pi/2;
%
%         else
%             theta_1 = 0;
%             theta_2 = pi/2;
%         end
%
%             p1 = (cos(theta_1)*cos(theta_2))^2;
%             p2 = (cos(theta_1)*sin(theta_1))^2;
%             p3 = (sin(theta_1)*cos(theta_2))^2;
%             p4 = (sin(theta_1)*sin(theta_2))^2;
%
%         if p1 > 0.5
%             s1 = 0;
%             s2 = 0;
%         elseif p2 > 0.5
%             s1 = 1;
%             s2 = 0;
%         elseif p3 > 0.5
%             s1 = 0;
%             s2 = 1;
%         elseif p4 > 0.5
%             s1 = 1;
%             s2 = 1;
%         else
%             s1 = 1;
%             s2 = 1;
%         end
% end
```

Solucion

A = 1

Δ = 0.1

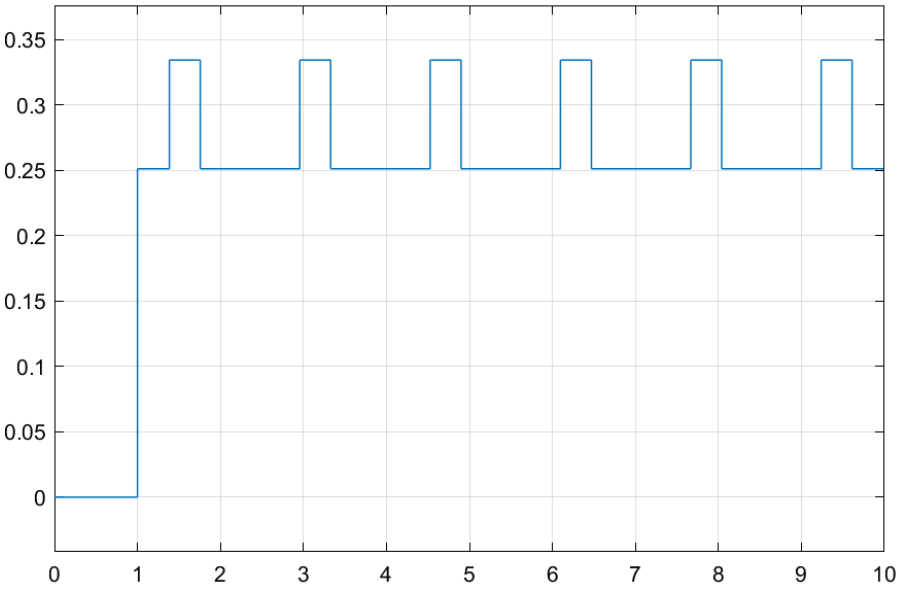
ω = 2



A = 1

Δ = 1

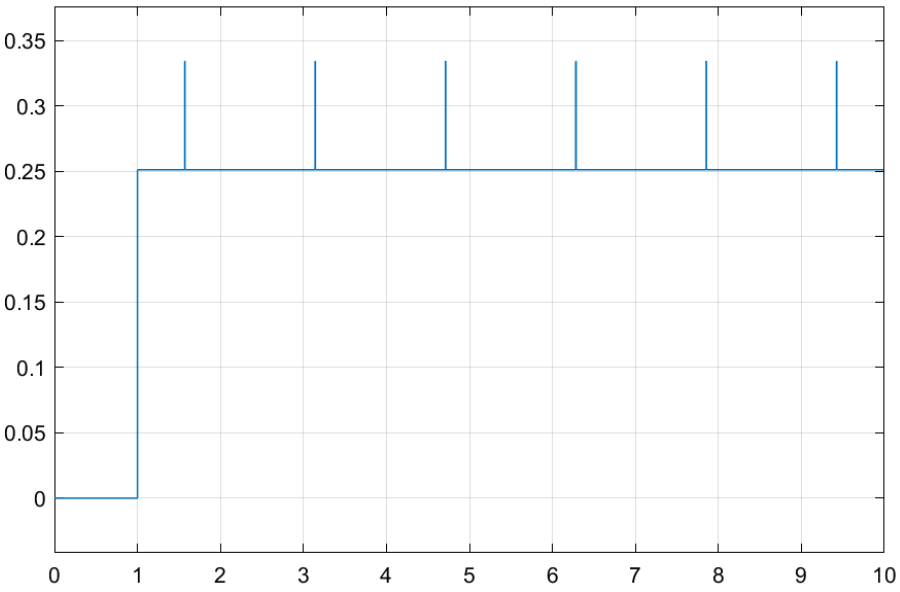
ω = 2



A = 10

Δ = 0.1

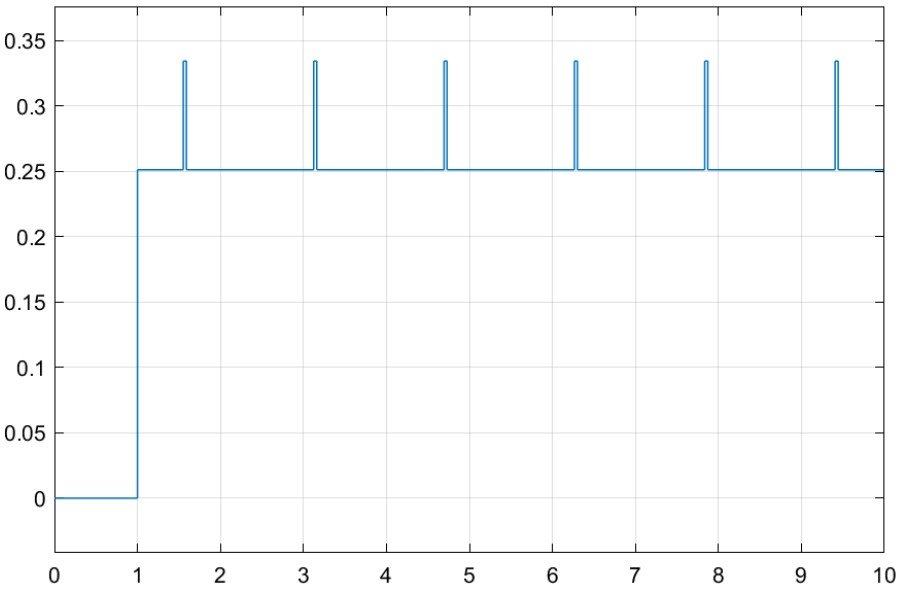
ω = 2



A = 10

Δ = 1

ω = 2

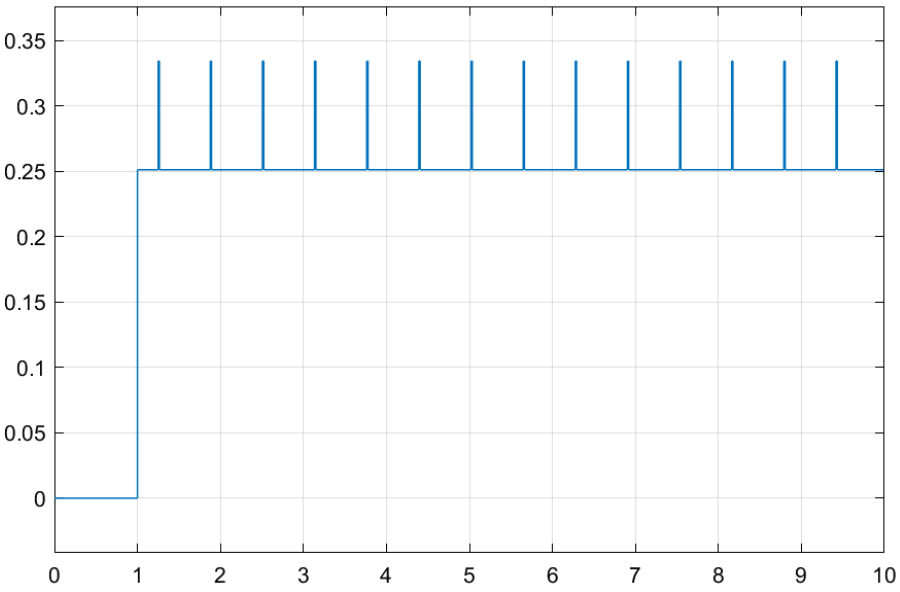


Solucion

A = 1

Δ = 0.1

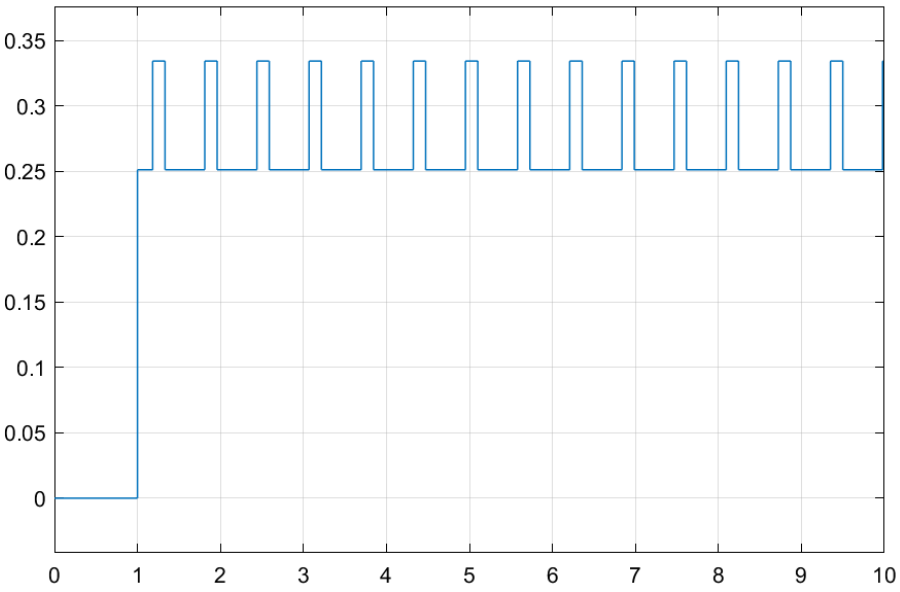
ω = 5



A = 1

Δ = 1

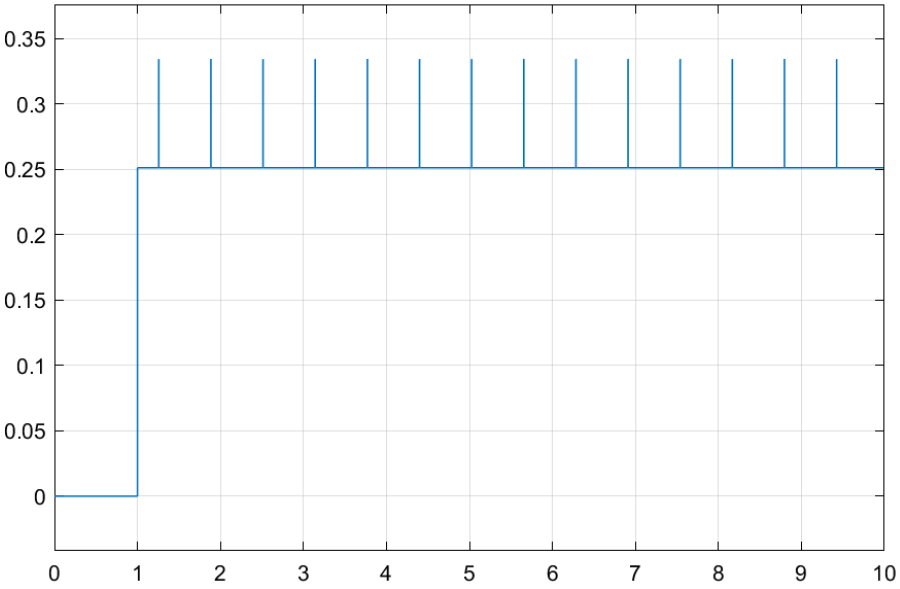
ω = 5



A = 10

Δ = 0.1

ω = 5



A = 10

Δ = 1

ω = 5