First we notice the fact, that every right 0-divisor in R is a left 0-divisor. If $R \sim R$^op, mentioned fact would imply that every left 0-divisor in R is a right 0-divisor. Now

$\beta = \begin{pmatrix} 2 & 0 \\ 0 & \overline{1} \end{pmatrix}$ is a left 0-divisor since $\begin{pmatrix} 2 & 0 \\ 0 & \overline{1} \end{pmatrix}\begin{pmatrix} 0 & \overline{1} \\ 0 & 0 \end{pmatrix} = 0$, but

$$0 = \begin{pmatrix} x & \overline{z} \\ 0 & \overline{y} \end{pmatrix}\begin{pmatrix} 2 & 0 \\ 0 & \overline{1} \end{pmatrix} = \begin{pmatrix} 2x & \overline{z} \\ 0 & \overline{y} \end{pmatrix} \Rightarrow x = 0, y = z = 0$$

shows that β is *not* a right 0-divisor—a contradiction.