Step-1

Suppose v_1, v_2, v_3 are the eigenvectors for *T*.

Then $T(v_i) = \lambda_i v_i$ for $i = 1,2,3$

We have to find the matrix for *T* when the input and output bases are the *v*â€™s.

Step-2

Since $T(v_i) = \lambda_i v_i$ for $i = 1,2,3$

So we can write

$$
\begin{aligned}
T(v_1) &= \lambda_1 v_1 \\
&= \lambda_1 v_1 + 0v_2 + 0v_3 \\
T(v_2) &= \lambda_2 v_2 \\
&= 0v_1 + \lambda_2 v_2 + 0v_3 \\
T(v_3) &= \lambda_3 v_3 \\
&= 0v_1 + 0v_2 + \lambda_3 v_3
\end{aligned}
$$

Therefore, the matrix of linear transformation *T* when the input and output basis is $\{v_1, v_2, v_3\}$ is $\boxed{\begin{bmatrix} \lambda_1 & 0 & 0 \\ 0 & \lambda_2 & 0 \\ 0 & 0 & \lambda_3 \end{bmatrix}}$.