

Mat-124

August 17, 2023

```
[9]: import sympy as sp

A = sp.Matrix([[1, 2],
               [-1, 0],
               [0, 1]])

B = sp.Matrix([[-1, 1],
               [0, 1]])

C = sp.Matrix([[-1, 1, 0],
               [0, 0, 1]])

D = sp.Matrix([[0, 1],
               [1, 1]])

A * B
```

```
[9]: 
$$\begin{bmatrix} -1 & 3 \\ 1 & -1 \\ 0 & 1 \end{bmatrix}$$

```

```
[11]: B * C
```

```
[11]: 
$$\begin{bmatrix} 1 & -1 & 1 \\ 0 & 0 & 1 \end{bmatrix}$$

```

```
[12]: (A * B) * C
```

```
[12]: 
$$\begin{bmatrix} 1 & -1 & 3 \\ -1 & 1 & -1 \\ 0 & 0 & 1 \end{bmatrix}$$

```

```
[13]: A * (B * C)
```

```
[13]: 
$$\begin{bmatrix} 1 & -1 & 3 \\ -1 & 1 & -1 \\ 0 & 0 & 1 \end{bmatrix}$$

```

```
[18]: B * A # no es posible multiplicar esta matriz
```

```

-----
ShapeError                                Traceback (most recent call last)
Cell In[18], line 1
----> 1 B*A

File ~\PycharmProjects\Matematicas\venv\Lib\site-packages\sympy\core\decorators
  py:106, in call_highest_priority.<locals>.priority_decorator.<locals>.
  binary_op_wrapper(self, other)
    104         if f is not None:
    105             return f(self)
--> 106 return func(self, other)

File ~\PycharmProjects\Matematicas\venv\Lib\site-packages\sympy\matrices\common
  py:2702, in MatrixArithmetic.__mul__(self, other)
    2673 @call_highest_priority('__rmul__')
    2674 def __mul__(self, other):
    2675     """Return self*other where other is either a scalar or a matrix
    2676     of compatible dimensions.
    2677     (...)
    2699     matrix_multiply_elementwise
    2700     """
-> 2702     return self.multiply(other)

File ~\PycharmProjects\Matematicas\venv\Lib\site-packages\sympy\matrices\common
  py:2724, in MatrixArithmetic.multiply(self, other, dotprodsimp)
    2720 if (hasattr(other, 'shape') and len(other.shape) == 2 and
    2721     (getattr(other, 'is_Matrix', True) or
    2722     getattr(other, 'is_MatrixLike', True))):
    2723     if self.shape[1] != other.shape[0]:
-> 2724         raise ShapeError("Matrix size mismatch: %s * %s." % (
    2725             self.shape, other.shape))
    2727 # honest SymPy matrices defer to their class's routine
    2728 if getattr(other, 'is_Matrix', False):

ShapeError: Matrix size mismatch: (2, 2) * (3, 2).

```

```
[27]: # Matriz identidad
```

```

rows, cols = A.shape
if (rows >= cols):
    n = rows
else:
    n = cols

Ai = sp.eye(n)

```

Ai

[27]:

$$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$