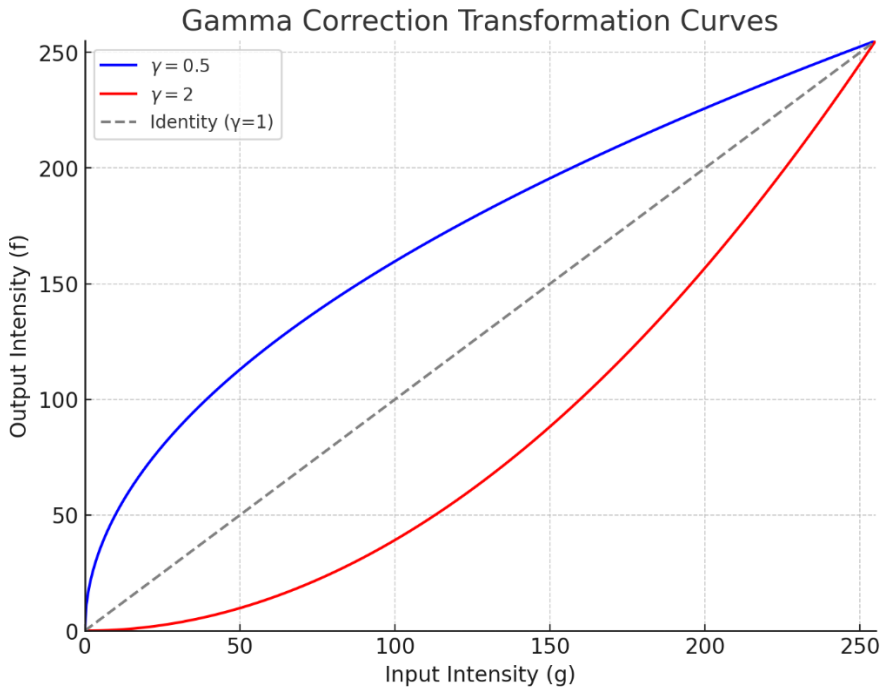
TASK 2

1. Sketch the transformation curve TG for γ1 = 0.5 and γ2 = 2.



2. How is the coefficient c typically determined?

The constant c is a scaling constant that ensures our outputs remain in the [0,255] range. Therefore, it is determined as: If g,f∈[0,255], then c=255^(1−γ)

3. In which respect and for which type of input images G do the two gamma values γ1 , γ2 lead to an image enhancement respectively?

For γ_1, T_G increases the brightness of the image. Specifically, the transformation maps lower input values to higher output values, enhancing shadow details.

For γ_2, T_G decreases the brightness of the image. For γ>1, the transformation maps higher input values to lower output values, enhancing contrast in bright regions.

4. What should be the minimum slope of the transform function? 1. for a grey value spread 2. for a grey value compression

In general:

For γ>1 (compression): The slope decreases as g→0. Minimum slope occurs near g = 0.

For γ<1(spread): The slope increases as g → 0. Minimum slope occurs near g=255.

Minimum Slope for Grey Value Spread (γ<1):

df/dg=255·0.5·(g/255)^−0.5

The slope decreases as g→255 and the **minimum slope occurs at g=255**:

(df/dg)|g=255 =255·0.5·(1)−0.5=127.5

Minimum Slope for Grey Value Compression (γ>1):

For grey value compression (γ=2):

df/dg=255·2·(g255)^1

The slope decreases as g→0, and the **minimum slope occurs at g=0**. However, near g=0, the slope asymptotically approaches zero.

To avoid extreme compression in practical applications, a small positive threshold g (e.g., g=1) is typically used. At g=1:

(df/dg)|g=1=255·2·(1/255) ≈2