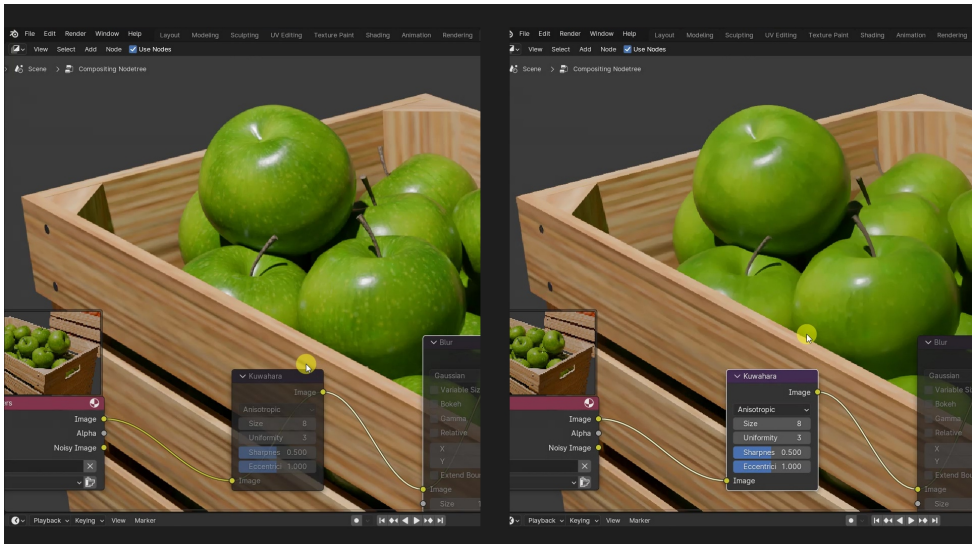
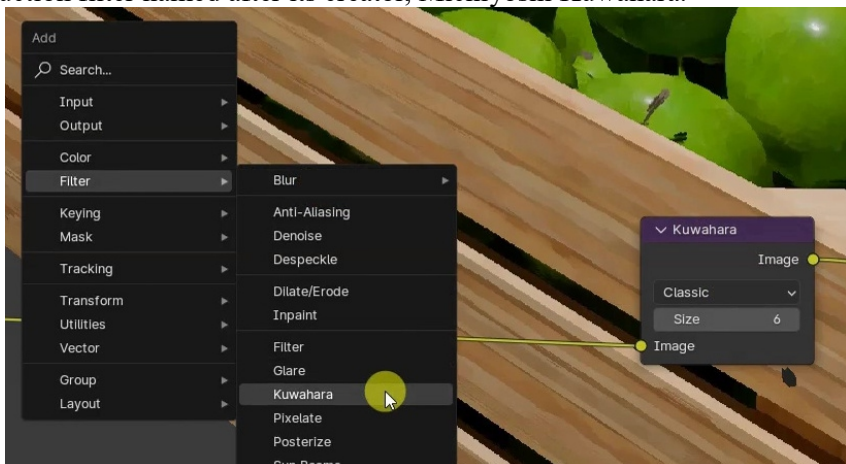


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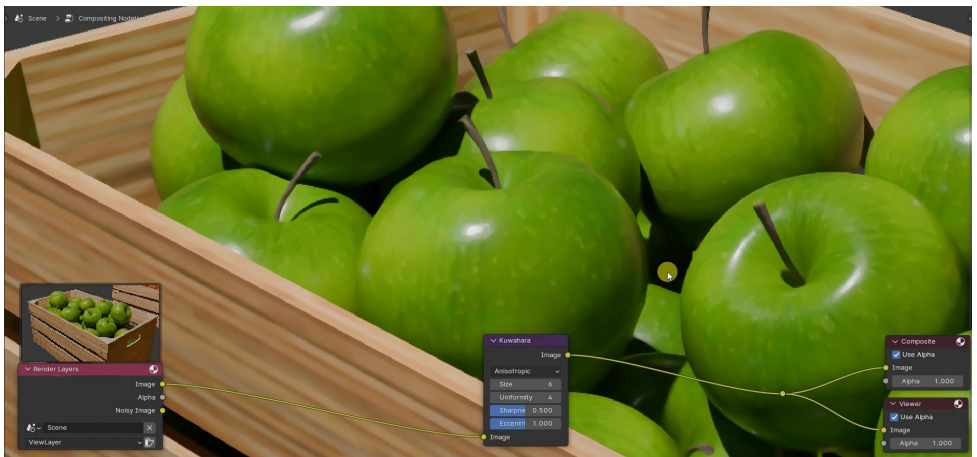


One of the new features introduced with Blender version 4 is the **Kuwahara Compositing** node, belonging to the **Filter** group. The node implements a post-production filter named after its creator, Michiyoshi Kuwahara.



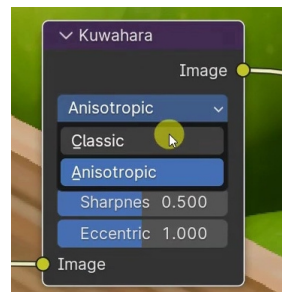
The filter allows for **noise reduction in images**, even at the cost of eliminating some **details**, without blurring the edges, as is the case with Blur and many linear Smoothing filters. Depending on the intensity, number of iterations, and other parameters, the final result can vary from a slightly modified version of the original image to a highly stylized one, considered by some to be painterly.

To analyze the effects of the node and its parameters, I chose the rendering of a container filled with apples, because they are healthy and their stems are **thin, elongated details**, which, along with other elements of the image, allow us to better examine the effects of various parameters.

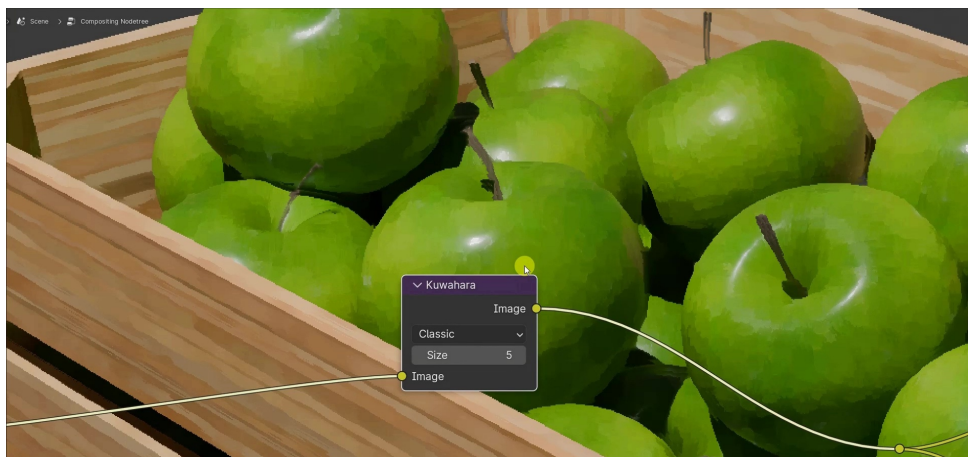


Let's start by saying that the node has two different modes: **Classic** and **Anisotropic**.

In both modes, the **Size** parameter is present, which is also the only parameter in **Classic** mode. This parameter defines **the size of the neighborhood of each pixel** to be considered for **Smoothing**. However, in **Classic** mode, this operation occurs without considering the edges or other characteristics of the image, so the filter does not maintain the edges, produces a blocky image, and can ruin delicate elements, like the previously mentioned apple stems.



The upside is that this mode is **very fast**, unlike the Anisotropic mode, which takes more time, especially as the value of some of its parameters increases.



Moving on to the **Anisotropic** mode, it immediately shows notable differences in quality compared to the Classic mode, with the same Size parameter value and maintaining the default values for the other parameters.

There is also an immediate **slowdown** in execution compared to the Classic mode.

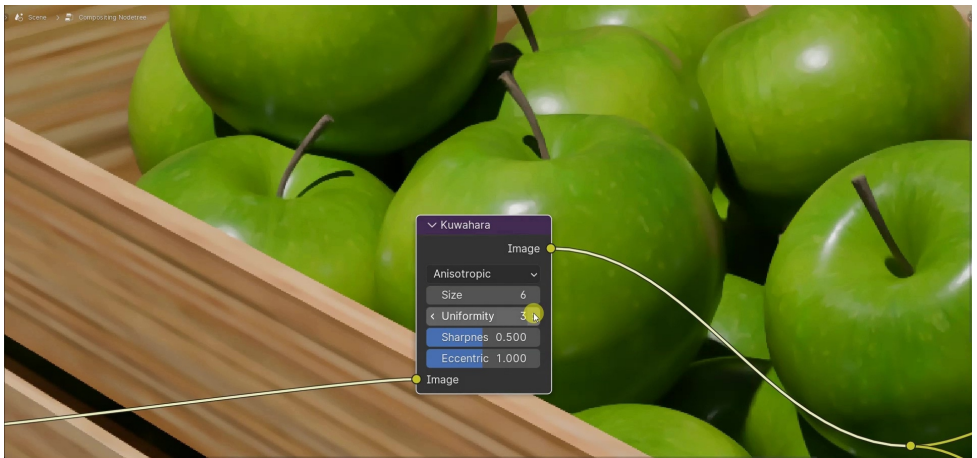
The Anisotropic mode offers three new parameters, and it's crucial to understand their purposes because they have significant effects on the details we want to preserve.

To maintain edges, **the Anisotropic mode operates in a directional manner.**

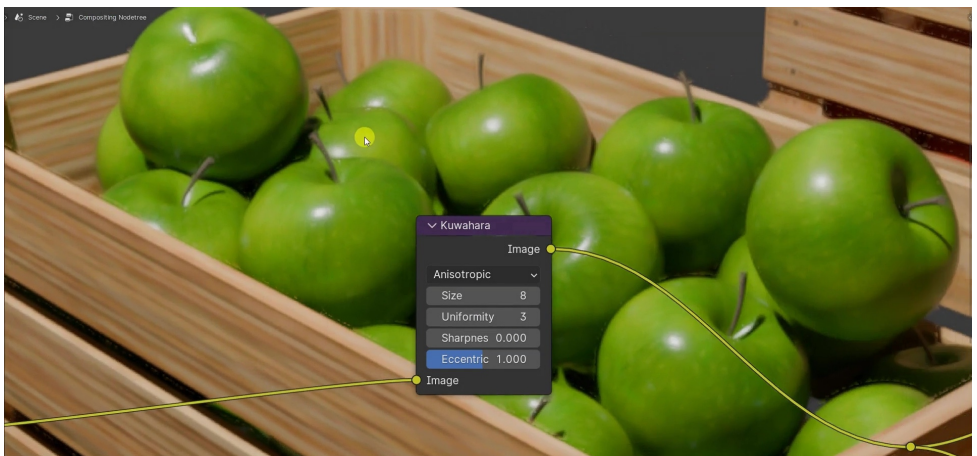
The uniformity of this direction in various areas is regulated by the **Uniformity** parameter.

In this case, one should **start with a low value**, increasing it until no significant errors are noticed, or generally, the result is acceptable.

This incremental process is also necessary because as the value of **Uniformity** increases, so do the processing times, making it unwise to start with high values immediately. In my case, for example, I'm stopping at a value of 3.

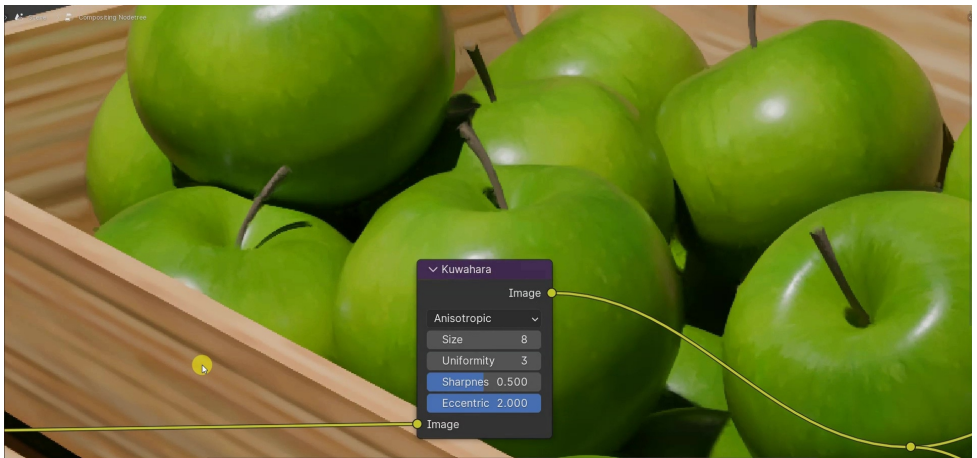
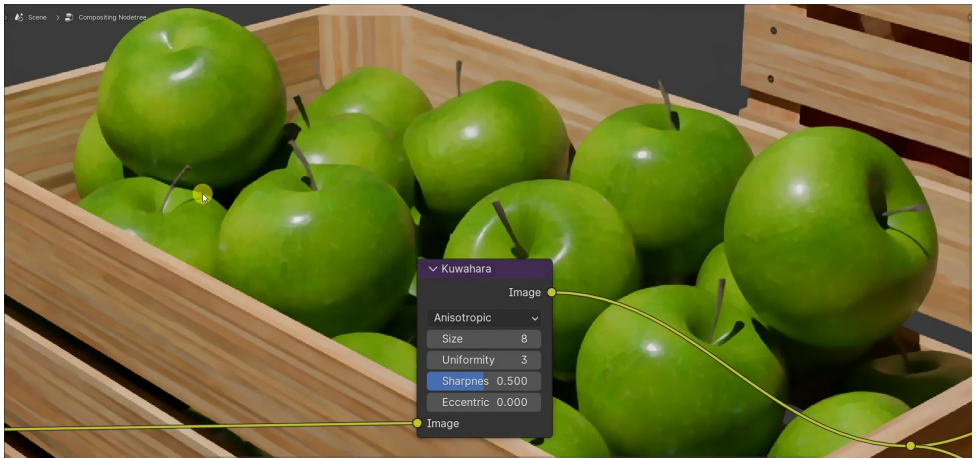


The **Sharpness** parameter, as the name suggests, determines the sharpness of the **edges** in the image. According to the tooltip, the value ranges from 0 to 1, with **0 indicating very intense blurring** and 1 maintaining the edges perfectly sharp.



The last parameter is **Eccentricity**, which might be a bit more technical as it indicates **the direction in which the filter will act** with greater intensity.

The value varies from 0 to 2. Setting the value to **0**, **the filter will act omnidirectionally**. This has significant effects on elongated elements and the edges of objects. With a value of **2**, the filter will predominantly act **along the edges** present in the image.



You can see the difference introduced in the original rendering by the Kuwahara filter set in this way in the first image of this PDF. Many of the details have disappeared, but it is clear that there is a significant difference between using this node and using a Blurring filter, which does eliminate noise and smaller details but ends up blurring the entire image.