Computer Graphics

Visualization II

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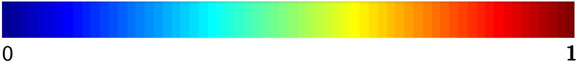
SAPIENZA
UNIVERSITÀ DI ROMA

2nd semester a.y. 2018/2019 · March 28, 2019

Colormap limits

Sometimes it is useful to modify the colormap to get saturation effects

We can increase the maximum value represented in the colormap:



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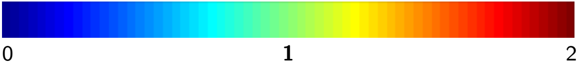

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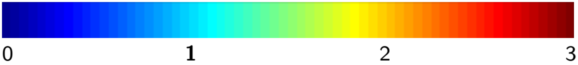

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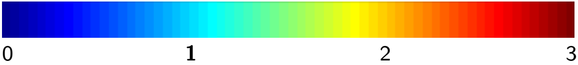

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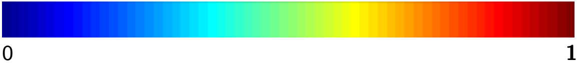
Similarly, we can decrease the max limit:



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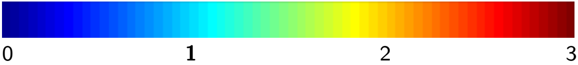

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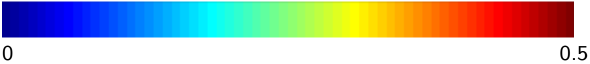

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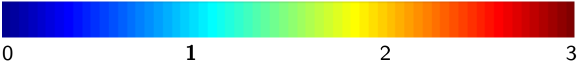

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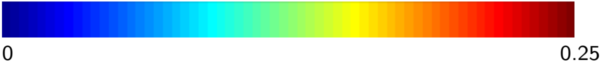

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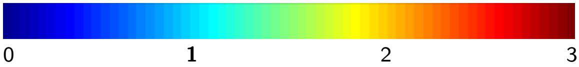

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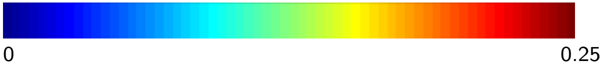
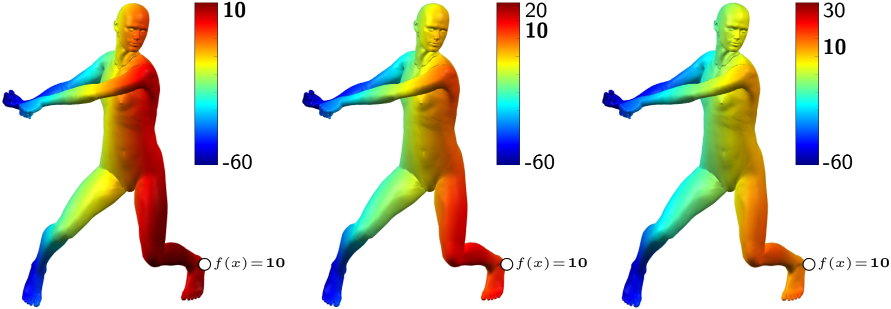


- Values $\geq$ the max limit are mapped to the max
- Values $\leq$ the min limit are mapped to the min
- Values between min and max are linearly interpolated

Increasing the max limit



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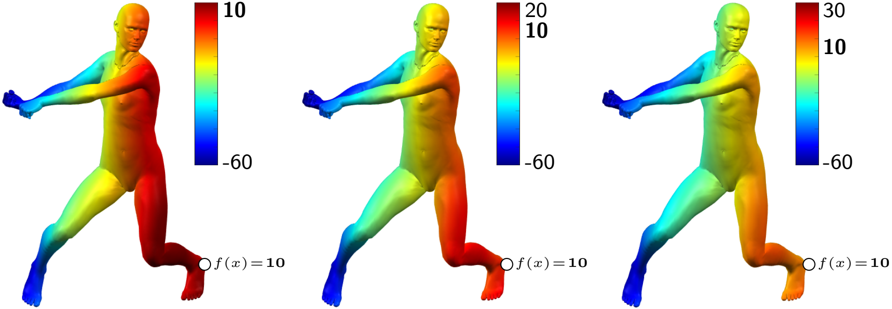

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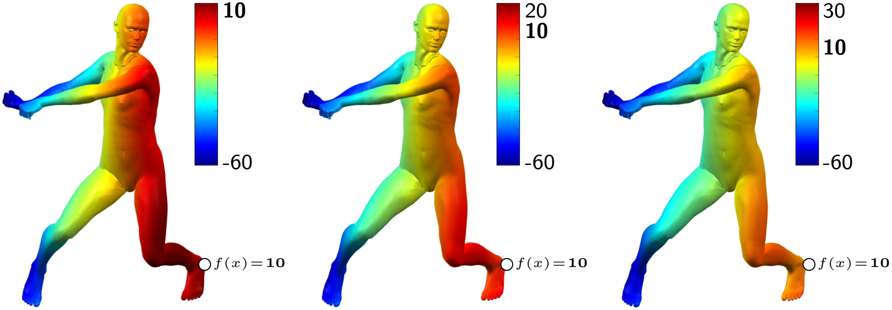

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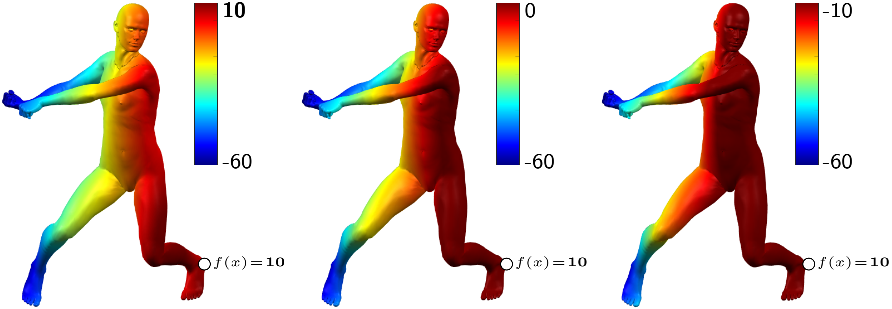
In Matlab: caxis ([min max]) sets the colormap limits and does all the saturation and interpolation for us

Decreasing the max limit



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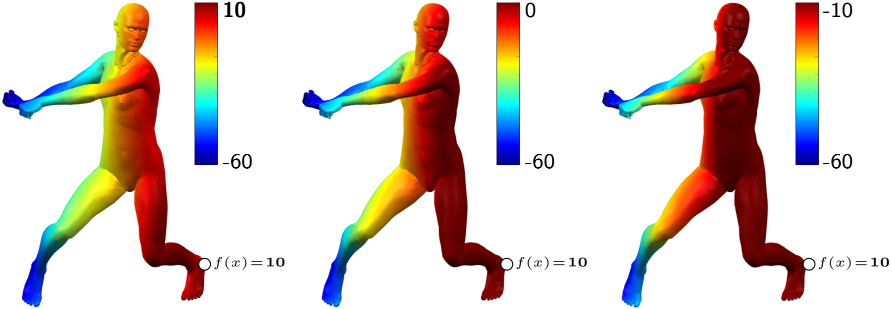
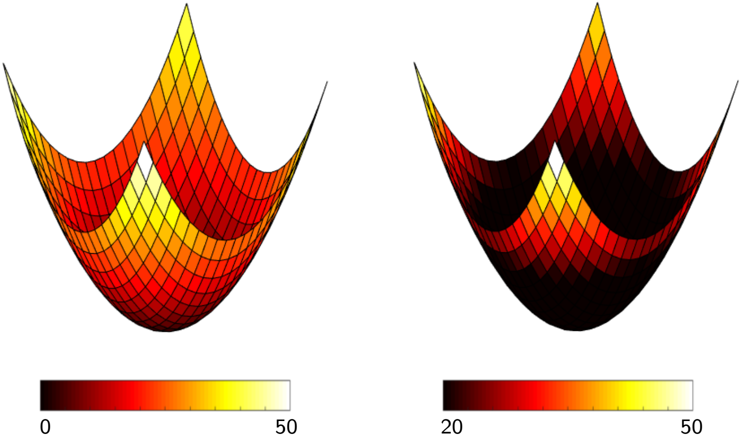


For smooth colormaps, the effect is to saturate the colors and make variations more evident

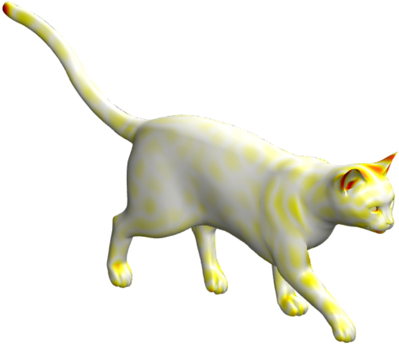
Example: Visualizing maxima

Increasing the min limit can be useful for visualizing maxima

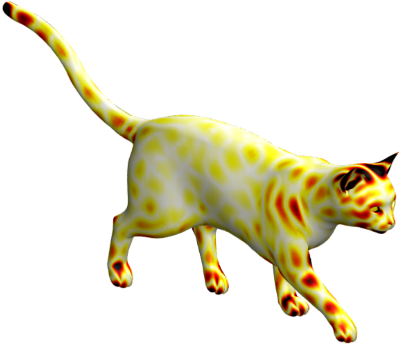


Example: Visualizing point-wise error

Emphasize areas of large error:



no saturation



saturate at 0.5

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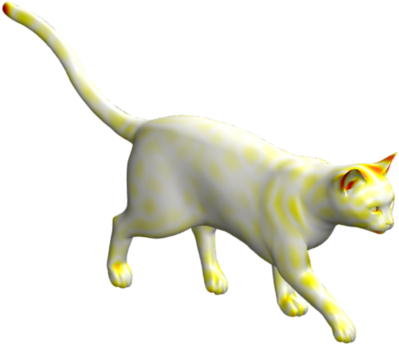

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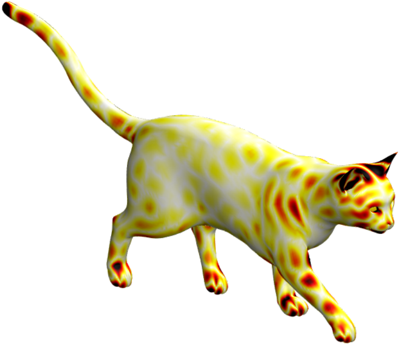

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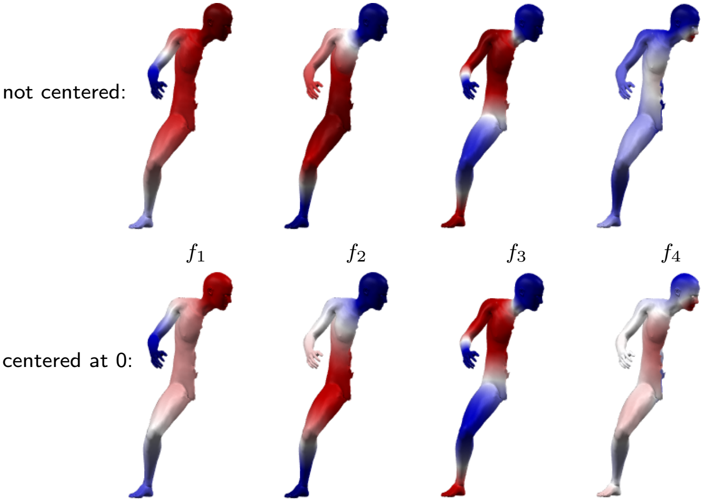
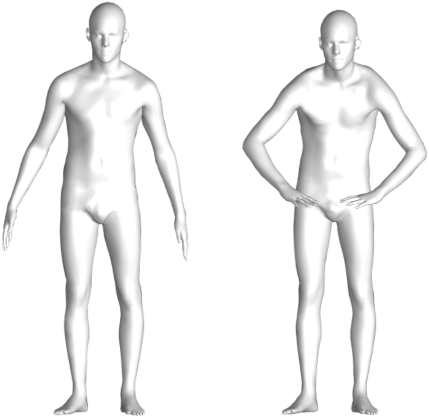
Example: Zero-centered functions

If $f :\to [-1,1]$ but f is not surjective, it can be useful to recenter colors



Coloring shapes

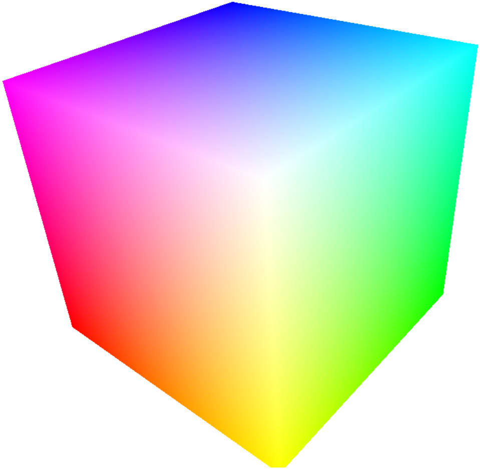
It is often useful to paint our surfaces



We may assign a color to each vertex, and interpolate between neighbors

Color cube

Given a color space (here represented by the RGB color cube), we can "carve out" our shapes out of this cube



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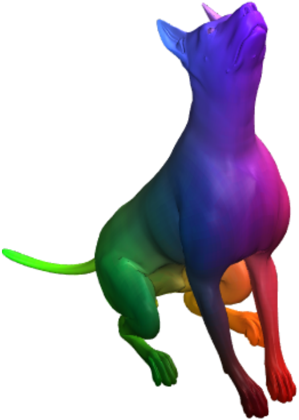

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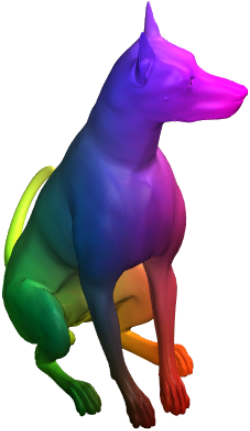

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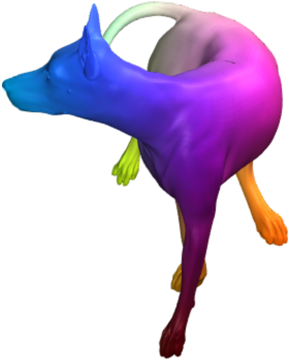

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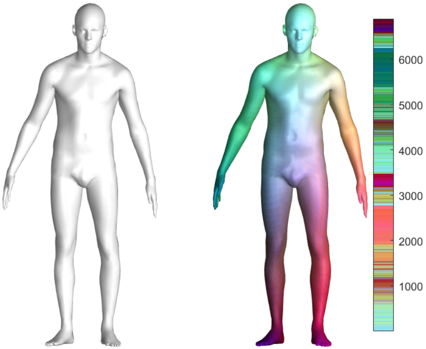

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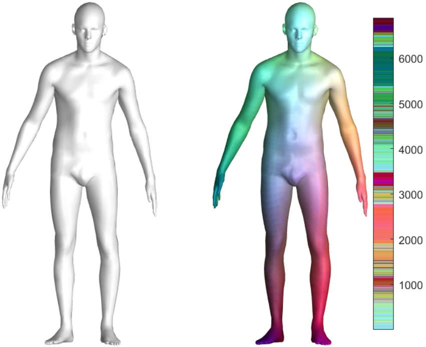

Warning: New versions of Matlab require shading flat (not interp)