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* filterwidth.h - Some handy macros for filter size estimation
*                 for antialiasing of shaders.
*
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* Reference:
*   _Advanced RenderMan: Creating CGI for Motion Picture_,
*   by Anthony A. Apodaca and Larry Gritz, Morgan Kaufmann, 1999.
*
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#ifndef FILTERWIDTH_H
#define FILTERWIDTH_H 1

/* Define metrics for estimating filter widths, if none has already
 * been defined. This is crucial for antialiasing.
 */
#ifndef MINFILTWIDTH
# define MINFILTWIDTH 1.0e-6
#endif

/* The filterwidth macro takes a float and returns the approximate
 * amount that the float changes from pixel to adjacent pixel.
 */
#define filterwidth(x) max (abs(Du(x)*du) + abs(Dv(x)*dv),
MINFILTWIDTH)

/* The filterwidthp macro is similar to filterwidth, but is for
 * point data.
 */
#define filterwidthp(p) max (sqrt(area(p)), MINFILTWIDTH)

/* Given a function g, its known average g_avg, its high frequency
 * feature size, and a filter width, fade to the average as we
 * approach
 * the Nyquist limit.
 */

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#define fadeout(g,g_avg,featuresize,fwidth) \  
    mix (g, g_avg, smoothstep(.2,.6,fwidth/featuresize))  
  
#endif /* FILTERWIDTH_H */
```