Standard Diffusion Approximation in the Spatial Frequency Domain

Calculate normalized diffuse SFD reflectance with the standard diffusion approximation.

$$R_d(k) = \frac{3Aa'}{(\mu'_{eff}/\mu_{tr} + 1)(\mu'_{eff}/\mu_{tr} + 3A)}$$

adapted from Cuccia et al. 2009

```
function Rd = diffApproxSFD(mua,musp,n,fx)
% diffApproxSFD(mua,musp,n,fx) returns the diffuse reflectance from a
% homogeneous medium ith bulk absorption coefficient (mua), reduced
% scattering coefficient, refractive index n, and spatial frequency
 fx.
%
% mua and musp can be vectors or N-D arrays of the same size,
% however, n and fx must be scalar.
%
% mua, musp, and fx have units of [1/mm]
% n is [unitless]
%
% EXAMPLE:
%   Rd = diffApproxSFD([0.001,0.01,0.1],[0.2,0.4,4],1.4,0.1)
%   returns
%   Rd = [0.0310    0.0873    0.4446]

% wavenumber in the x-direction
kx = 2*pi*fx;

% effective reflection coefficient
Reff = 0.0636*n+0.668+(0.71/n)-(1.44/(n^2));

% proportionality constant
A = (1-Reff)/(2*(1+Reff));

% reduced albedo
a = musp./(mua+musp);

% effective interaction coefficient for an SFD source
mueff = ((3*mua.*(mua+musp)) + kx^2).^(1/2);

% numerator
num = 3*A*a;

% denominator factor 1
den1 = (mueff./(mua+musp)) + 1;

% denominator factor 2
den2 = (mueff./(mua+musp)) + 3*A;
```

```
% final Rd calculation for function return
Rd = num./(den1.*den2);

end
```

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