Subject: Re: Through-transmission studies
Date: Wednesday, March 29, 2023 at 4:20:09 PM Mountain Daylight Time
From: christen@eng.utah.edu on behalf of Doug Christensen
To: Christopher Dillon
Attachments: USmultiflite3a.m

Chris,

Attached is the updated version. The changes can be summarized by:

```
Mar 29, 2023 Major improvements:
%   1. Instead of using a fixed value for speed of sound in the water bath, which is used in the calculation of the
%    sample speed of sound and which depends on temperature, the actual temperature of the bath is now an input
%    parameter in a dialog box, and the actual speed of sound is calculated using a formula from
%    Greenspan and Tschiegg, JResNBS, vol. 59, no. 4, Oct. 1957.
%   2. Instead of a log-log plot of attenuation as a function of frequency to estimate the exponential in the frequency
%    dependence formula, a power-law fit using 'a*x^n+b' and the 'fit' function in the Curve Fitting Toolbox is implemented.
%    This has two benefits:
%    a) The fit is consistent with an attenuation power-law curve and the exponential can now be found more accurately.
%    b) In circumstances where the face(s) of the sample are somewhat convex(concave) such the the beam is slightly
%     divergent(focused) as it passes through the sample, thus causing an artificial addition(subtraction) to the
%     attenuation value, this artificial bias can be effectively eliminated by shifting (adjusting) the attenuation values
%     such that the power-law curve is forced to pass through the origin (this is based on the reasonable power-law
%     assumption of "zero frequency equals zero attenuation").
```

This latest version needs the MATLAB Curve Fitting Toolbox. I would be happy to discuss this program with you or your students at any time.

Doug
Doug Christensen
christen@ee.utah.edu

> On Mar 29, 2023, at 11:56 AM, Christopher Dillon <chris.dillon@byu.edu> wrote:
>
> Yes, I've been using different versions of the MATLAB code for through transmission and would be happy to have an updated version. What improvements have you made? I'd be glad to discuss some time.
>
> Best,
>
> Chris

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From: christen@eng.utah.edu <christen@eng.utah.edu> on behalf of Doug Christensen <christen@ee.utah.edu>
Date: Wednesday, March 29, 2023 at 11:20 AM
To: Christopher Dillon <chris.dillon@byu.edu>
Subject: Through-transmission studies

Chris,

Are you doing through-transmission studies in your lab using the MATLAB code I wrote for my lab? If so, I have updated and improved the code and would be happy to send you a copy.

Doug

Doug Christensen
christen@ee.utah.edu