demo 06

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Question 04

The Python demo program implements the fourth-order difference equation with 8 variables to store past values (i.e., 8 delay units). This is the the direct form implementation. But a fourth-order difference equation can be implemented using just 4 variables to store past values (i.e., 4 delay units). The canonical form can be used for this purpose. See the block diagram in Fig. 7.2.4 on page 274 of the text book 'Introduction to Signal Processing' by Orfanidis

http://www.ece.rutgers.edu/~orfanidi/intro2sp/orfanidis-i2sp.pdf

The software implementation of the canonical form is shown in Equation 7.2.5 on the same page.

Modify the Python demo program to implement the difference equation using the canonical form. Instead of 8 delay variables (y1, y2, y3, y4, x1, x2, x3, x4) your new program should have just 4 delay variables. **Verify the output produced by this implementation is the same as the output produced by the demo program.**

Answer:

It is safe to conclude that based on the waveform plots shown in `demo6-q4-verified.png`, we can conclude that the output produced by this implementation is the same as the output produced by the demo program.