

**M353 P4** (S. Zhang) Computer problems 3.2:3, 4.1:2 .

1. (3.2:c3') The total world oil production in millions of barrels per day is shown in the table that follows.

(1) Determine and plot the degree 9 (as shown) polynomial through the data. You may use anyone of three methods, unknown coefficients, Langrage basis, or Newton divided differences. Use it to estimate 2010 oil production. In your opinion, is the interpolating polynomial a good model of the data? Explain.

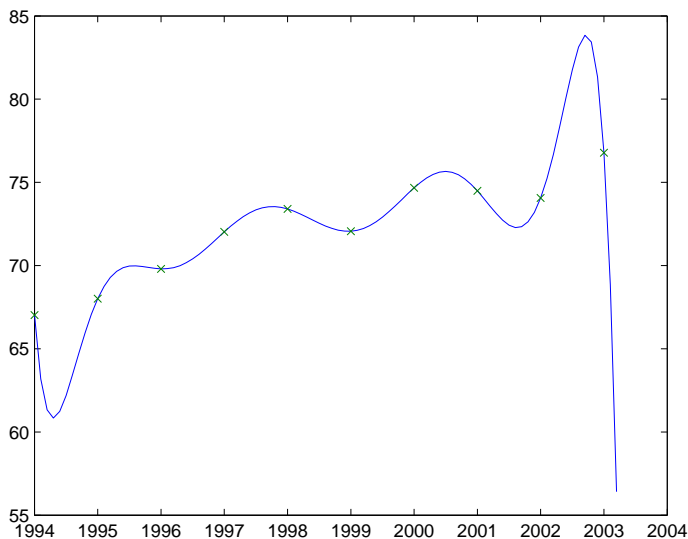
(2) Do (1) again, interpolating 3 years' data of your own selection, by a degree 2 polynomial.

Output two sets of coefficients, two graphs, and two 2010 approximations.

year	production
1994	67.025
1995	68.008
1996	69.803
1997	72.024
1998	73.400
1999	72.063
2000	74.669
2001	74.487
2002	74.065
2003	76.777

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Hint, you may shift the year number in  $x$ -axis to avoid huge computer error.



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2. (4.1:c2') The total world oil production in millions of barrels per day is shown in the table that follows.

Determine and plot the degree 1, 2, 3 and 4 polynomials by the 10 data points, via the least squares method. Find and compare their RMSE. And estimate 2010 oil production each case.

Output 4 sets of coefficients, 4 graphs, 4 errors, and 4 2010 approximations. Which one might give a better prediction?