Quantum II HW5

Vincent Baker

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1 Problem 1

We find the first 5 Fourier coefficients of $\frac{1}{3+2\cos\theta}$ using numerical integration of $\frac{1}{2\pi}\int_{-\pi}^{\pi}\frac{e^{-ik\theta}}{3+2\cos\theta}d\theta$.

$$k_0 = \frac{2.8099}{2\pi} \tag{1.1}$$

$$k_1 = \frac{0.2685}{2\pi} \tag{1.2}$$

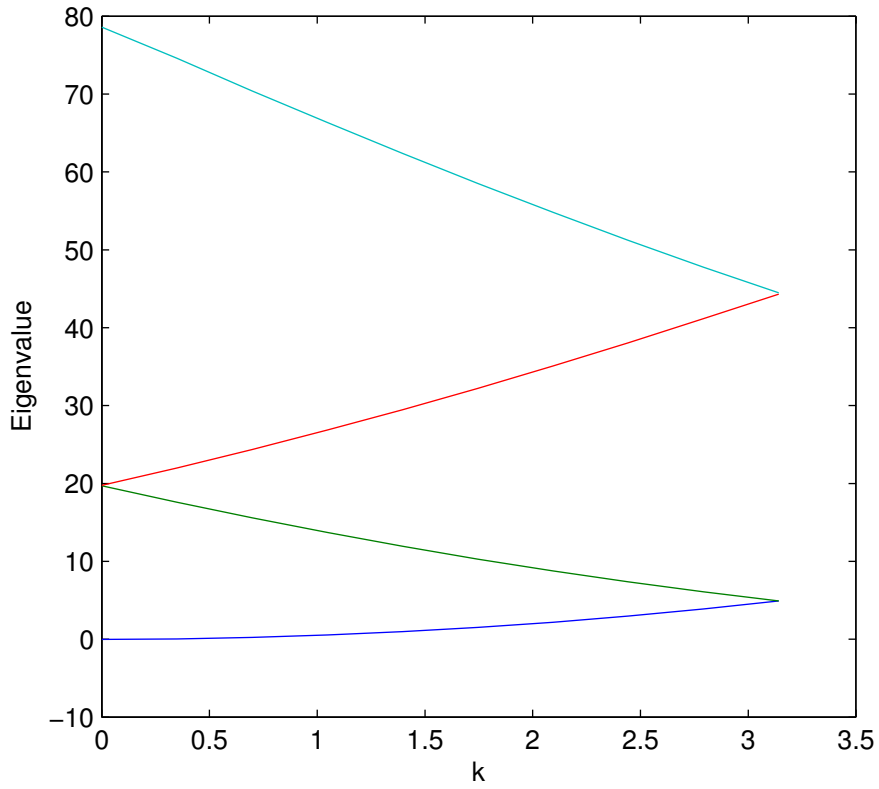
$$k_2 = \frac{0.1579}{2\pi} \tag{1.3}$$

$$k_3 = \frac{0.0486}{2\pi} \tag{1.4}$$

$$k_4 = \frac{-0.0323}{2\pi} \tag{1.5}$$

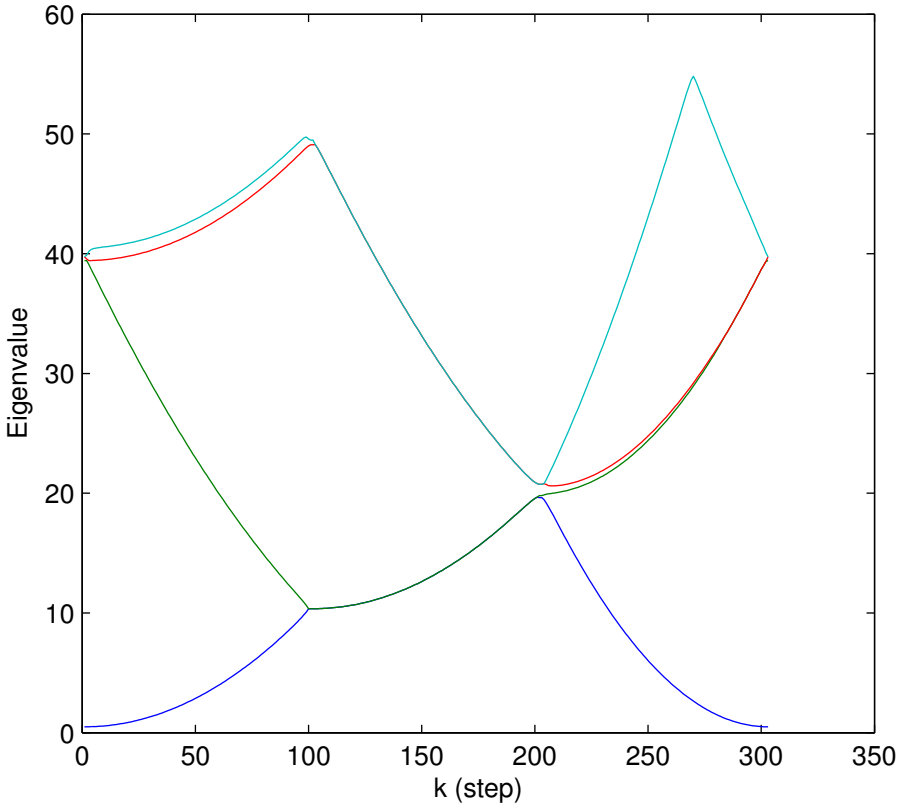
2 Problem 2

The problem is set up in p2.m. The results are shown below.



3 Problem 3

The problem is set up in p3.m. The results are shown below. 100 steps are taken along each segment.


60
50
40
30
20
10
0
Eigenvalue
0
50
100
150
200
250
300
350
k (step)