Integral Equations in Visual Computing
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Assignment C5

(classroom assignment)

Problem: Consider the integral equation

$$u(x) = \mu \int_0^{\pi} (\cos^2(x)\cos(2t) + \cos^3(t)\cos(3x))u(t)\ dt\,.$$

Calculate the characteristic values and the corresponding eigenfunctions of this equation.

*H*int: Observe

$$\begin{aligned}\int \cos^3(x)\cdot\cos(3x)\ dx &= \frac{1}{8}x + \frac{3}{16}\sin(2x) + \frac{3}{32}\sin(4x) + \frac{1}{48}\sin(6x) + C\,,\\ \int \cos^2(x)\cdot\cos(2x)\ dx &= \frac{1}{4}x + \frac{1}{4}\sin(2x) + \frac{1}{16}\sin(4x) + C\,.\end{aligned}$$