HW #8

*7.7.1. Solve as simply as possible:

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$$\frac{\partial^2 u}{\partial t^2} = c^2 \nabla^2 u$$

with $u(a, \theta, t) = 0, u(r, \theta, 0) = 0$, and $\frac{\partial u}{\partial t}(r, \theta, 0) = \alpha(r) \sin 3\theta$.

7.7.2. Solve as simply as possible:

$$\frac{\partial^2 u}{\partial t^2} = c^2 \nabla^2 u \text{ subject to } \frac{\partial u}{\partial r}(a, \theta, t) = 0$$

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with initial conditions

(a) $u(r, \theta, 0) = 0$, $\quad \frac{\partial u}{\partial t}(r, \theta, 0) = \beta(r) \cos 5\theta$

7.9.1. Solve Laplace's equation inside a circular cylinder subject to the boundary conditions

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(c) $u(r, \theta, 0) = 0$, $\quad u(r, \theta, H) = \beta(r) \cos 3\theta$, $\quad \frac{\partial u}{\partial r}(a, \theta, z) = 0$

7.9.2. Solve Laplace's equation inside a semicircular cylinder, subject to the boundary conditions

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*(b) $u(r, \theta, 0) = 0$, $\quad \frac{\partial u}{\partial z}(r, \theta, H) = 0$, $\quad u(r, 0, z) = 0$,

$u(r, \pi, z) = 0$, $\quad u(a, \theta, z) = \beta(\theta, z)$