Mathematical Modelling in the Natural Sciences
SS16, Exercises, Sheet 7

Solutions to be presented on 6. May 2016

1. Adapt the convection diffusion code on pages 145 – 146 in
   `http://imsc.uni-graz.at/keeling/numpde_ss16/numpde.pdf`
   to simulate the convection of contrast agent through a vessel so that the contrast agent diffuses along the vessel, through the vessel walls and within the tissue surrounding the vessel. (Solved by Andreas Holm)

2. Determine the convolution kernel $K(t)$ for each of the two problems on page 151 of
   `http://imsc.uni-graz.at/keeling/modII_ss16/modnsc.pdf`
   (Hint: See Section 2 of `http://imsc.uni-graz.at/invcon/medimage/kernel1.pdf`.)
   (Solved by Florian Thaler)

3. As discussed on page 152 of
   `http://imsc.uni-graz.at/keeling/modII_ss16/modnsc.pdf`
   construct a simple example $(N_\epsilon, C_{\mathrm{AIF}}, E_\epsilon)$ satisfying $N_\epsilon = C_{\mathrm{AIF}} * E_\epsilon$ and $N_\epsilon \to 0$, $\epsilon \to 0$ while $E_\epsilon \to \infty$, $\epsilon \to 0$. (Solved by Andrea Holm)