Electromagnetic Theory: Homework 7
Due: 11 September 2014

This assignment will be graded immediately after the due date. If you get all problems correct, then you will receive 100%. If you have made any errors, then I will deduct 10% (or for a single minor error 5%), point the errors out and you must submit a corrected assignment by 18 September 2014. If there are still errors, then I will deduct another 10% and you must submit the corrected assignment by 25 September 2014. This will continue until you have solved every problem correctly.

1 Divergence and curl in spherical coordinates

Let
\[ \mathbf{v} = 2 \hat{r} + 2 \hat{\theta} \]
in spherical coordinates.

a) Determine the divergence of \( \mathbf{v} \).
b) Determine the curl of \( \mathbf{v} \).
c) Is the sketch of \( \mathbf{v} \) in the yz-plane consistent with your results?

2 Griffiths, *Introduction to Electrodynamics*, Problem 1.57, page 55. Modify the problem so that the section of the path following \((0,1,0) \rightarrow (0,1,2) \rightarrow (0,0,0)\) is replaced by a single straight line section following \((0,1,0) \rightarrow (0,0,0)\). The answer is different to that given in the text.