FH Kaernten

Systems Design Master's
Field Numerics
Homework 3

Student: Metin Oktay Yılmaz

1. Transform the position (1,2,3) from Cartesian into cylindrical coordinates.

$$r = \sqrt{x^2 + y^2} = \sqrt{1 + 4} = 2.236 \tag{1}$$
$$\varphi = atan(y/x) = atan(2/1) = 63.434^\circ \tag{2}$$
$$z = z = 3 \tag{3}$$

2. Transform the vector field (x^2, y^2, z^2) from Cartesian into spherical coordinates.

$$F = (x^2, y^2, z^2) \tag{4}$$
$$r = \sqrt{x^4 + y^4 + z^4} \tag{5}$$
$$\varphi = atan(y^2/x^2) \tag{6}$$
$$\theta = acos(z^2/r) \tag{7}$$