Computational Mechanics by Isogeometric Analysis
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Exercises March 13, 2014
B–splines and NURBS: hpk–refinements

1. Perform different levels of h–, p–, and k–refinements for the univariate B–spline basis functions associated with the following knot vectors:

   a) $\Xi = \{0, 0, 1, 1\}$;

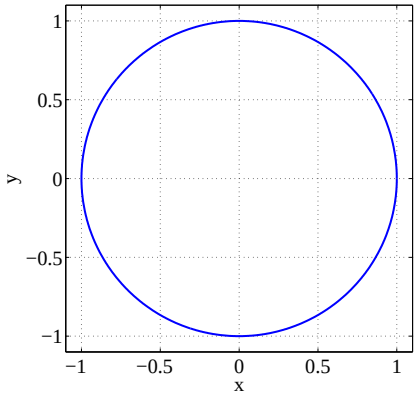
   b) $\Xi = \{0, 0, 1/2, 1, 1\}$;

   c) $\Xi = \{0, 0, 0, 1/2, 1, 1, 1\}$;

   d) $\Xi = \{0, 0, 0, 1/2, 1/2, 1, 1, 1\}$.

   Plot the basis functions obtained with the different refinement procedures by using the MATLAB function `display_univariate_nurbs_basis_functions.m`.

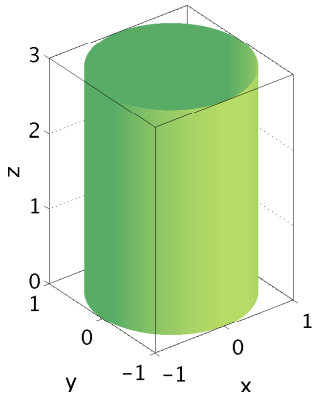
2. Perform different levels of h–, p–, and k–refinements for the the following curve (circle).



   Use the MATLAB function `display_nurbs_curve_knotinsertion_orderelevation.m`.

3. Starting from point 2), use the knot insertion procedure to locally modify one quarter of the circle.

4. Perform different levels of h–, p–, and k–refinements for the the following surface (cylindrical shell).



Use the MATLAB function `display_nurbs_surface_knotinsertion_orderelevation.m`.