

Preface

This book introduces the concept of Extremely Modular System (EMS), which jointly meets three criteria:

- It allows for creation of structurally sound free-form structures;
- It is comprised of as few types of modules as possible;
- It is not constrained by a regular tessellation of space.

Two EMSs are presented: Pipe-Z (PZ) and Truss-Z (TZ). PZ is more fundamental and forms spatial mathematical knots by assembly of one type of unit (PZM). The shape of PZ is controlled by relative twists of a sequence of congruent PZMs.

TZ is a skeletal system for creating free-form pedestrian ramps and ramp networks among any number of terminals in space. TZ structures are composed of four variations of a single basic unit subjected to affine transformations (mirror reflection, rotation and combination of both).

This book presents results of the research titled: *Effective computational methods for grid and raster-based modeling of practical problems in architectural and urban design* conducted from December 2013 to November 2015 under the **Singapore University of Technology & Design and Massachusetts Institute of Technology Postdoctoral Program**.

Warsaw, Poland
June 2016

Machi Zawidzki

Discrete Optimization in Architecture

Extremely Modular Systems

Zawidzki, M.

2017, XIV, 121 p. 118 illus., 72 illus. in color., Softcover

ISBN: 978-981-10-1108-5