

Contents

1	Introduction	1
2	To Begin With: PGD for Poisson Problems	7
2.1	Introduction	7
2.2	The Poisson Problem	8
2.3	Matrix Structure of the Problem	12
2.4	Matlab Code for the Poisson Problem	15
3	Parametric Problems	21
3.1	A Particularly Challenging Problem: A Moving Load as a Parameter	21
3.2	The Problem Under the PGD Formalism	23
3.2.1	Computation of $S(s)$ Assuming $R(x)$ Is Known	24
3.2.2	Computation of $R(x)$ Assuming $S(s)$ Is Known	25
3.3	Matrix Structure of the Problem	26
3.4	Matlab Code for the Influence Line Problem	30
4	PGD for Non-linear Problems	39
4.1	Hyperelasticity	40
4.2	Matrix Structure of the Problem	43
4.2.1	Matrix Form of the Term $T2$	44
4.2.2	Matrix Form of the Term $T4$	46
4.2.3	Matrix Form of the Term $T6$	47
4.2.4	Matrix Form for the Term $T8$	48
4.2.5	Matrix Form of the Term $T9$	49
4.2.6	Matrix Form of the Term $T10$	51
4.2.7	Final Comments	52
4.3	Matlab Code	52
5	PGD for Dynamical Problems	65
5.1	Taking Initial Conditions as Parameters	65
5.2	Developing the Weak Form of the Problem	66

- 5.3 Matrix Form of the Problem 68
 - 5.3.1 Time Integration of the Equations of Motion 68
 - 5.3.2 Computing a Reduced-Order Basis for the Field
of Initial Conditions. 70
 - 5.3.3 Projection of the Equations onto a Reduced,
Parametric Basis 71
- 5.4 Matlab Code 75
- References 91**
- Index 95**



<http://www.springer.com/978-3-319-29993-8>

Proper Generalized Decompositions
An Introduction to Computer Implementation with
Matlab

Cueto, E.; González, D.; Alfaro, I.

2016, XII, 96 p. 20 illus., 1 illus. in color., Softcover

ISBN: 978-3-319-29993-8