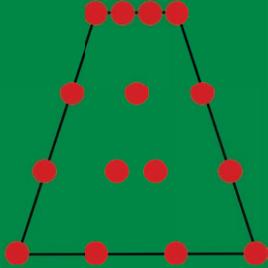
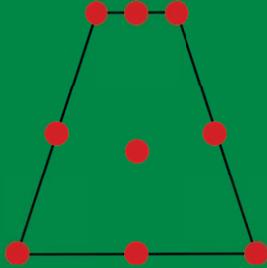
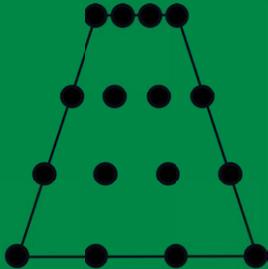
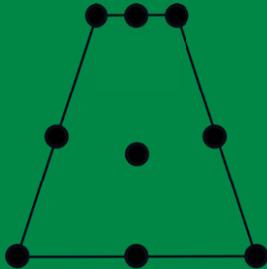


Acta

Numerica

Volume 32

2023



CAMBRIDGE
UNIVERSITY PRESS

Acta Numerica 2023

Editor-in-Chief

D. N. Arnold

*School of Mathematics, University of Minnesota,
206 Church Street SE, Minneapolis, MN 55455, USA*

Editorial Board

A. Cohen, Sorbonne Université, Paris, France

W. Dahmen, University of South Carolina, USA

B. Engquist, University of Texas at Austin, USA

N. Higham, University of Manchester, UK

I. C. F. Ipsen, North Carolina State University, USA

A. Iserles, University of Cambridge, UK

V. Mehrmann, TU Berlin, Germany

S. Mishra, ETH Zürich, Switzerland

I. Perugia, University of Vienna, Austria

E. Tadmor, University of Maryland, College Park, USA

L. N. Trefethen, Harvard University, USA

K. Willcox, University of Texas at Austin, USA

B. Wohlmuth, Technical University of Munich, Germany

S. J. Wright, University of Wisconsin, Madison, USA

Acta

Numerica

Volume 32

2023



CAMBRIDGE
UNIVERSITY PRESS

Published by the Press Syndicate of the University of Cambridge
The Pitt Building, Trumpington Street, Cambridge CB2 1RP
One Liberty Plaza, Floor 20, New York, NY 10006, USA
10 Stamford Road, Oakleigh, Melbourne 3166, Australia

© Cambridge University Press 2023

First published 2023

Printed in Great Britain at the University Press, Cambridge

Library of Congress cataloguing in publication data available

A catalogue record for this book is available from the British Library

ISBN 978-1-009-41974-1
ISSN 0962-4929

Contents

Low-rank tensor methods for partial differential equations	1
<i>Markus Bachmayr</i>	
The virtual element method	123
<i>Lourenço Beirão da Veiga, Franco Brezzi, L. Donatella Marini and Alessandro Russo</i>	
Floating-point arithmetic	203
<i>Sylvie Boldo, Claude-Pierre Jeannerod, Guillaume Melquiond and Jean-Michel Muller</i>	
Compatible finite element methods for geophysical fluid dynamics . . .	291
<i>Colin J. Cotter</i>	
Control of port-Hamiltonian differential-algebraic systems and applications	395
<i>Volker Mehrmann and Benjamin Unger</i>	
Overcoming the timescale barrier in molecular dynamics: Transfer operators, variational principles and machine learning	517
<i>Christof Schütte, Stefan Klus and Carsten Hartmann</i>	
Linear optimization over homogeneous matrix cones	675
<i>Levent Tunçel and Lieven Vandenbergh</i>	