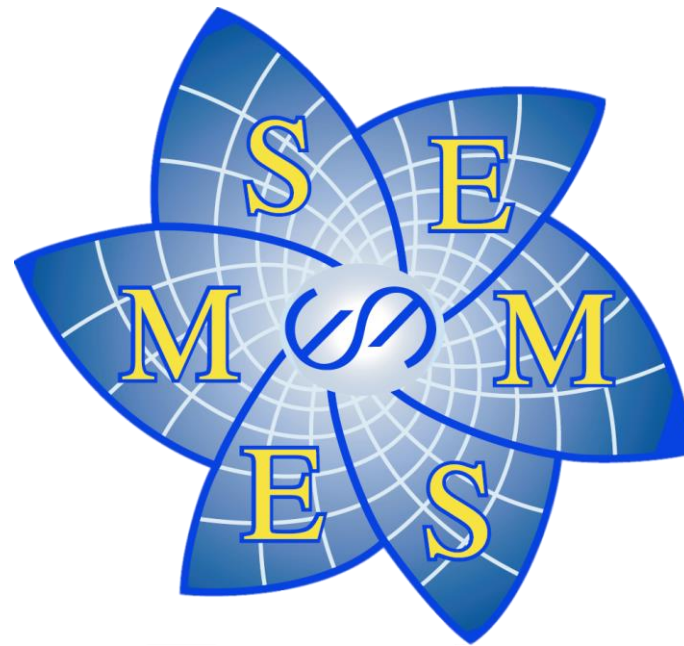




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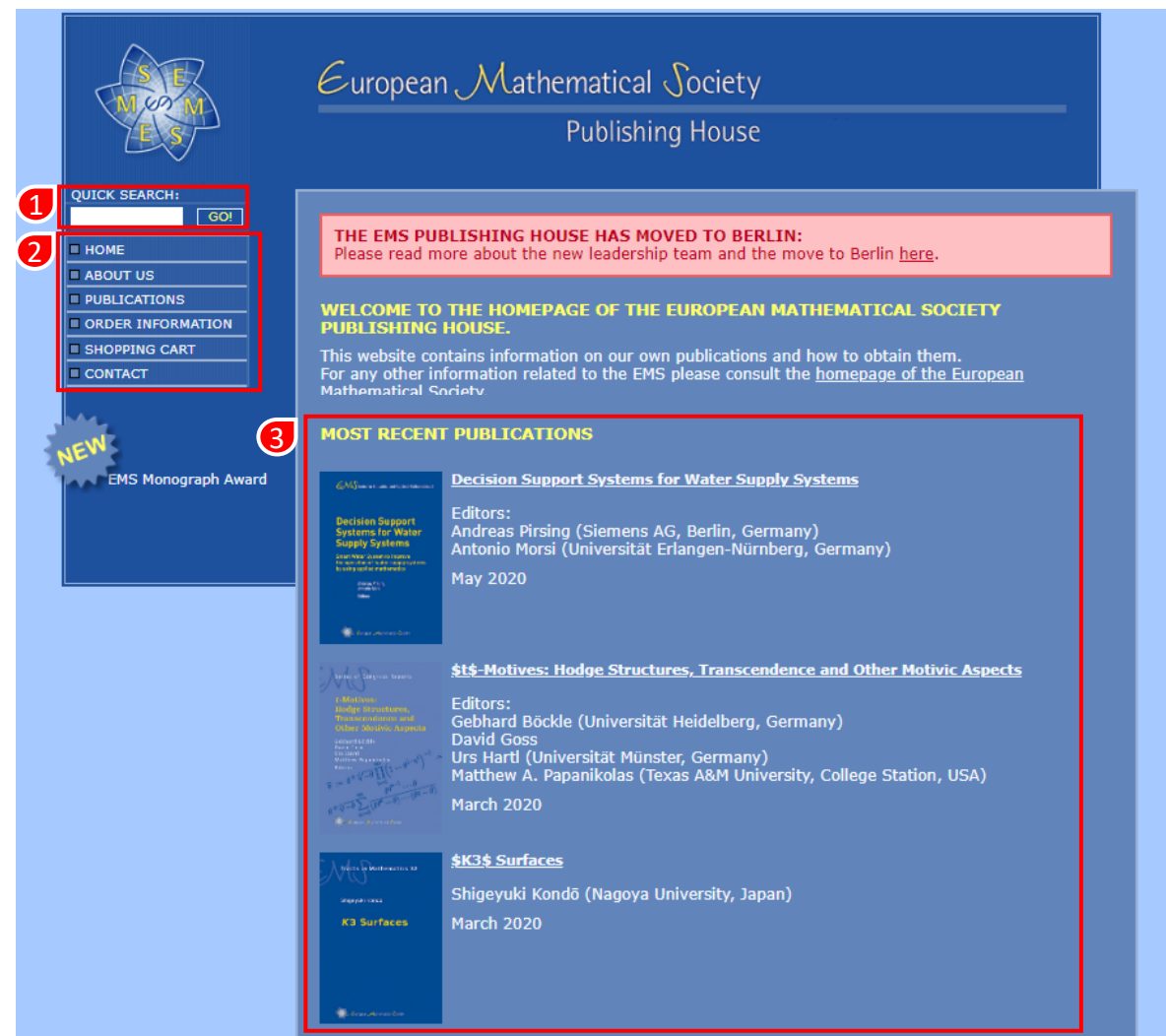
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Satellite ruling polynomials, DGA representations, and the colored HOMFLY-PT polynomial

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We establish relationships between two classes of invariants of Legendrian knots in \mathbb{R}^3 : representation numbers of the Chekanov–Eliashberg DGA and satellite ruling polynomials. For positive permutation braids, $\beta \in J^1S^1$, we give a precise formula in terms of representation numbers for the m -graded ruling polynomial $R_{S(K,\beta)}^m(z)$ of the satellite of K with β specialized at $z = q^{1/2} - q^{-1/2}$ with q a prime power, and we use this formula to prove that arbitrary m -graded satellite ruling polynomials, $R_{S(K,L)}^m$, are determined by the Chekanov–Eliashberg DGA of K . Conversely, for $m \neq 1$, we introduce an n -colored m -graded ruling polynomial, $R_{n,K}^m(q)$, in strict analogy with the n -colored HOMFLY-PT polynomial, and show that the total n -dimensional m -graded representation number of K to \mathbb{R}_q^m , $\text{Rep}_m(K, \mathbb{R}_q^m)$, is exactly equal to $R_{n,K}^m(q)$. In the case of 2\ndash graded representations, we show that $R_{n,K}^2(q) = \text{Rep}_2(K, \mathbb{R}_q^m)$ arises as a specialization of the n -colored HOMFLY-PT polynomial.

Keywords: Legendrian knot, ruling polynomial, Chekanov–Eliashberg DGA, representation, colored HOMFLY-PT polynomials

Leverson Caitlin, Rutherford Dan: Satellite ruling polynomials, DGA representations, and the colored HOMFLY-PT polynomial. *Quantum Topol.* 11 (2020), 55–118. doi: 10.4171/QT/133

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