Spaces of resultants of bounded multiplicity and its related problems

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For positive integers $m, n, d \geq 1$ with $(m, n) \neq (1, 1)$ and a field $\mathbb{F}$ with its algebraic closure $\overline{\mathbb{F}}$, let $\mathrm{Poly}_n^{d,m}(\mathbb{F})$ denote the space of all m-tuples $(f_1(z), \cdots, f_m(z)) \in \mathbb{F}[z]$ of monic polynomials of the same degree d such that polynomials $f_1(z), \cdots, f_m(z)$ have no common root in $\overline{\mathbb{F}}$ of multiplicity $\geq n$. These spaces were first considered by Farb and Wolfson in [1] as a generalization of spaces studied by Arnold, Vassiliev, Segal and others in different contexts (eg. [2], [3], [5], [6]). In this talk we shall investigate the homotopy type of the space $\mathrm{Poly}_n^{d,m}(\mathbb{C})$ for the case $\mathbb{F} = \mathbb{C}$ with $m, n \geq 2$, and announce our recent joint work with A. Kozlowski [4]. Our results generalize those of [1] for $\mathbb{F} = \mathbb{C}$ and also results of G. Segal [5], V. Vassiliev [6] and others for $m \geq 2$ and $n \geq 2$.

References

[1] B. Farb and J. Wolfson, Topology and arithmetic of resultants, I: spaces of rational maps, New York J. Math. **22** (2016), 801-826.

[2] M. A. Guest, A. Kozlowski and K. Yamaguchi, Spaces of polynomials with roots of bounded multiplicity, Fund. Math. **116** (1999), 93–117.

[3] M. A. Guest, A. Kozlowski and K. Yamaguchi, Stable splitting of the space of polynomials with roots of bounded multiplicity, J. Math. Kyoto Univ. **38** (1998), 351–366.

[4] A. Kozlowski and K. Yamaguchi, The homotopy type of spaces of resultants of bounded multiplicity, (arXiv:1612.06793).

[5] G. B. Segal, The topology of spaces of rational functions, Acta Math. **143** (1979), 39–72.

[6] V. A. Vassiliev, Complements of discriminants of smooth maps, Topology and Applications, Amer. Math. Soc., Translations of Math. Monographs **98**, 1992 (revised edition 1994).