Formulas for the Casson invariant of homology 3-spheres

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Abstract. (This is a Joint work with M. Seo.) In this talk, we consider a representation of knots and links in S^3 by integral matrices and then give an explicit formula for the Casson invariant for homology 3-spheres obtained from S^3 by Dehn surgery along the knots and links represented by the integral matrices, in terms of the entries and framings. As applications, we discuss the preimage of the Casson invariant for a given integer and also give formulas for the Casson invariants for some special classes of homology 3-spheres.