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ON A RELATION BETWEEN CLASSICAL AND FREE INFINITELY DIVISIBLE TRANSFORMS

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Abstract. We study two ways (two levels) of finding free-probability analogues of classical infinitely divisible measures. More precisely, we identify their Voiculescu transforms on the imaginary axis. For free-selfdecomposable measures we find a formula (a differential equation) for their background driving transforms. It is different from the one known for classical selfdecomposable measures. We illustrate our methods on hyperbolic characteristic functions. Our approach may produce new formulas for definite integrals of some special functions.

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Key words and phrases: infinite divisibility, free-infinite divisibility, convolution semigroups, characteristic function, Voiculescu transform, Lévy–Khinchin formula, Lévy (spectral) measure, Riemann zeta functions, Euler function, digamma function.