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ENDOSCOPY AND REAL GROUPS

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Endoscopy is an example of Langlands' functoriality principle. It arises when representations with same L-functions appear with different multiplicities in automorphic forms. For $SL(2)$, Labesse and Langlands determined the multiplicity of certain representations $\pi = \otimes_v \pi_v$ in terms of the *position* of each π_v among representations with same local L-factor. Langlands' proposed generalization of the local analysis, transfer of orbital integrals and characters between $SL(2)$ and an anisotropic torus, is accessible for the tempered spectrum of real groups through the Plancherel theory of Harish Chandra. The Arthur conjectures carry the program to the nontempered spectrum. We will outline some of the features and a proof of tempered endoscopy for real groups using canonical transfer factors for the geometric transfer. We then sketch the proof of a simple explicit formula for the spectral transfer factors in the dual transfer of stable tempered characters. As time permits, we will discuss the Arthur conjectures, examples of the spectral factors for p-adic groups, and proposed twisted analogues.