Let $H = H(x, p)$ be a function on T^*M, Hamiltonian.
Let $S = S(x, q, t)$ be a solution of equation

$$\begin{cases} \frac{\partial S(x,q,t)}{\partial t} = H\left(x, \frac{\partial S(x,q,t)}{\partial x}\right) \\ S(x,q,t)\big|_{t=0} = xq \end{cases}$$

Let $A = A(x, t)$ be a solution of equation

$$\begin{cases} \frac{\partial A(x,t)}{\partial t} = H\left(x, \frac{\partial A(x,t)}{\partial x}\right) \\ A(x,t)\big|_{t=0} = g(x) \end{cases}$$

Then for thick morphism Φ_{S_t},

$$\Phi^*_{S_t}(g(y)) = A(x, t)$$

Konechno dlia harmonicheskogo oscillatora, eto Legendre trnasformation=quasiclassic of Forrier transformation