Specifications of Hamiltonian System [mln95]

Canonical variables:

- Canonical coordinates: $q_1, \ldots, q_n;\ p_1, \ldots, p_n$.
- Hamiltonian: $H(q_1, \ldots, q_n; p_1, \ldots, p_n)$.
- Canonical equations: $\dot{q}_i = \dfrac{\partial H}{\partial p_i}, \quad \dot{p}_i = -\dfrac{\partial H}{\partial q_i}$.
- Dynamical variable: $f(q_1, \ldots, q_n; p_1, \ldots, p_n) = f(t)$.

Noncanonical variables:

- Elementary dynamical variables: $u_1, \ldots, u_m$.
- Energy function: $\bar{H}(u_1, \ldots, u_m)$.
- Symplectic structure: $\{u_i, u_j\} = B_{ij}(u_1, \ldots, u_m)$.
- Hamilton's equations: $\dot{u}_i = \{u_i, \bar{H}\}$.
- Dynamical variable: $f(u_1, \ldots, u_m) = f(t)$.

Link to quantum mechanics:

- Elementary operators: $u_1, \ldots, u_m$.
- Hamiltonian operator: $\bar{H}(u_1, \ldots, u_m)$.
- Commutation relations: $[u_i, u_j] = A_{ij}(u_1, \ldots, u_m)$.
- Dynamical variable: $f(u_1, \ldots, u_m) = f(t)$.
- Heisenberg equation: $\dot{f} = \dfrac{1}{i\hbar}[f, \bar{H}]$.