import matplotlib.pyplot as plt

# داده‌ها

failure\_costs = [30, 60, 90, 120, 150, 180, 210, 240, 270, 300]

# سیاست فقط بازتخصیص

avg\_cost\_reallocate = [6.333917, 7.627540, 8.655267, 9.674572, 10.686223,

 11.697857, 12.709492, 13.721126, 14.732760, 15.744394]

# سیاست فقط نگهداری

avg\_cost\_maintain = [10.556648, 10.582081, 10.607513, 10.632946, 10.658379,

 10.683811, 10.709244, 10.734676, 10.760109, 10.785542]

# سیاست ترکیبی

avg\_cost\_combined = [9.199894, 9.423432, 9.599743, 9.776054, 9.952366,

 10.123356, 10.296941, 10.470526, 10.641480, 10.814377]

# محاسبه افزایش درصدی نسبت به سیاست ترکیبی

increase\_maintain = [(m - c) / c \* 100 for m, c in zip(avg\_cost\_maintain, avg\_cost\_combined)]

increase\_reallocate = [(r - c) / c \* 100 for r, c in zip(avg\_cost\_reallocate, avg\_cost\_combined)]

fig, axs = plt.subplots(1, 2, figsize=(14,6))

# نمودار متوسط هزینه

axs[0].plot(failure\_costs, avg\_cost\_reallocate, marker='^', color='orange', label='reallocate-only policy')

axs[0].plot(failure\_costs, avg\_cost\_maintain, marker='o', color='red', label='maintain-only policy')

axs[0].plot(failure\_costs, avg\_cost\_combined, marker='s', color='blue', label='reallocate-and-maintain policy')

axs[0].set\_xlabel("Cost of system failure")

axs[0].set\_ylabel("Minimal expected cost per unit time")

axs[0].set\_title("(a) Minimal average cost per unit time")

axs[0].legend()

# نمودارافزایش هزینه درصدی

axs[1].plot(failure\_costs, increase\_maintain, color='black', label='maintain-only policy')

axs[1].plot(failure\_costs, increase\_reallocate, color='black', linestyle='--', label='reallocate-only policy')

axs[1].set\_xlabel("Cost of system failure")

axs[1].set\_ylabel("Percentage increase in cost")

axs[1].set\_title("(b) Cost increase (%)")

axs[1].legend()

plt.tight\_layout()

plt.show()