import matplotlib.pyplot as plt

# داده‌ها

replacement\_costs = [20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40]

# سیاست فقط بازتخصیص

avg\_cost\_reallocate = [6.211390, 6.490267, 6.769145, 7.048023, 7.326900,

7.605778, 7.884656, 8.163169, 8.441028, 8.718362, 8.995615]

# سیاست فقط نگهداری

avg\_cost\_maintain = [5.350383, 5.876944, 6.403505, 6.930066, 7.456626,

7.983187, 8.509748, 9.036309, 9.562869, 10.089430, 10.615991]

# سیاست ترکیبی

avg\_cost\_combined = [5.134211, 5.586836, 6.039461, 6.492809, 6.946001,

7.398086, 7.850172, 8.302257, 8.754343, 9.206428, 9.658514]

# 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(replacement\_costs, avg\_cost\_reallocate, marker='^', color='orange', label='reallocate-only policy')

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

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

axs[0].set\_xlabel("Cost of unit maintenance")

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

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

axs[0].legend()

# نمودار افزایش هزینه درصدی

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

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

axs[1].set\_xlabel("Cost of unit maintenance")

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

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

axs[1].legend()

plt.tight\_layout()

plt.show()